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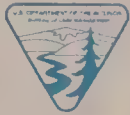
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*terior Columbia Basin Ecosystem Management Project*

# Interior Columbia Basin Supplemental Draft Environmental Impact Statement

## *Volume 2 - Appendices*

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# **Interior Columbia Basin Supplemental Draft Environmental Impact Statement**

## **Volume 2**

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# ICBEMP Supplemental Draft EIS

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# Appendix 1

## Scientific, Legal, and Planning Background

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### Summary

Appendix I provides an overview of the major scientific studies that contributed to the development of the Interior Columbia Basin Ecosystem Management Project EIS. It also lists the major laws and executive orders that constitute the legal framework for planning and management of lands administered by the BLM and Forest Service. The last portion of this appendix includes planning considerations that underlie planning efforts of the BLM and the Forest Service and lists the land use plans currently in effect in the ICBEMP project area.

Appendix I (approximately 10 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.

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# Callanvogue A

James Callaghan  
2000-2001  
Callanvogue A

# Appendix 2

## GIS Data and Databases

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### Summary

Appendix 2 describes the development of the ICBEMP interagency Geographic Information System (GIS) data and databases. Adapted from the Information System chapter (Gravenmier et al. 1997) of the *Scientific Assessment* (Quigley and Arbelbide 1997), this appendix contains sections on GIS data layers or themes, documentation, management, and data sharing. A table lists all the data layers in the GIS used for the Interior Columbia Basin Ecosystem Management Project.

Appendix 2 (approximately 22 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.

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# Appendix A

Environmental  
Records



# Appendix 3

## Public Involvement

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## Introduction

The Interior Columbia Basin Ecosystem Management Project ("the project") was chartered by the Director of the Bureau of Land Management (BLM) and the Chief of the Forest Service in January 1994. The project charter directed that the development of an ecosystem management strategy be a multi-agency effort involving the public in an open process. In its commitment to an open process, the project involves people early and often, shares information as it became available, and uses both traditional and non-traditional methods to reach a wide spectrum of people interested in the management of public lands.

Collaboration, interaction and consultation occur with other federal, state, county, and tribal government officials, and with special interest groups, interested individuals, and the general public. Hundreds of public meetings have been held throughout the project area and there have been innumerable briefings, conference calls, collaborative intergovernmental working meetings, and one-on-one information exchanges.

In describing the project's public involvement process, this appendix summarizes the public involvement activities from the inception of the Project in early 1994, through the public comment period on the Eastside and Upper Columbia River Basin (UCRB) Draft EISs which lasted from June 1997 - May 1998. The appendix continues with a summary of public involvement efforts from May 1998 to the release of this Supplemental Draft EIS, and concludes by outlining opportunities for future public involvement in project development and implementation.

(A more detailed discussion of the overall public involvement process for the development of the Draft EISs can be found in Appendices 1-3 and 1-4 of the Eastside Draft EIS and Appendix D of the UCRB Draft EIS.)

## Public Involvement Prior to Publishing the Eastside and Upper Columbia River Basin Draft EISs

### Scoping

Scoping is a process required in the early stages of preparing an EIS to encourage public participation and solicit public input on the scope and significance of the proposed action (NEPA, 40 CFR 1501.7). Comments received during scoping help determine what issues are to be considered in the development and range of alternatives in the EIS.

Scoping for the Eastside EIS was initiated with the publication of the Notice of Intent in the *Federal Register* on February 1, 1994. During February and March 1994, twelve public meetings were held in Washington and Oregon to introduce the Interior Columbia Basin Ecosystem Management Project. In May and June 1994, fifteen scoping meetings were held in both states, to allow the public to participate in identifying issues to be addressed in the Eastside EIS. In all, more than 1,700 members of the public attended the introductory and scoping meetings. The scoping period on the Eastside EIS continued through July 2, 1994, during which the Eastside EIS Team received more than 350 written comments in the form of letters, postcards, response forms, and faxes.

Scoping for the Upper Columbia River Basin Draft EIS formally opened with the publication of the Notice of Intent in the *Federal Register* on December 7, 1994, and



closed on April 15, 1995. On January 28, 1995, a far-reaching scoping effort was accomplished by means of a video teleconference broadcast from Boise State University. During the teleconference, project managers and staff in Boise presented information about the project and solicited feedback from the public. The teleconference was broadcast simultaneously in 27 meeting locations across the region, where Forest Service or BLM staff were on hand to facilitate discussions and collect input from the public. More than 900 people participated in the one-day scoping session. Two additional scoping meetings were held in February 1995 in the towns of Challis and Salmon, Idaho, which were attended by 133 people.

## Issues Identified During Scoping

Input during the scoping periods for the two EISs came from a wide spectrum of interest groups; individuals; American Indian tribes; and federal, state, and local governments. From the information received, the following significant issues were identified:

- ♦ In what condition should the ecosystem be maintained?
- ♦ To what degree, and under what circumstance, should restoration be active (with human intervention) or passive (letting nature take its course)?
- ♦ What emphasis will be assigned when tradeoffs are necessary among resources, species, land areas, and uses?
- ♦ To what degree will ecosystem management support economic and/or social needs of people, cultures, and communities?
- ♦ How will ecosystem-based management incorporate the role of natural disturbance processes?
- ♦ What types of opportunities will be available for cultural, recreational, and aesthetic experiences?
- ♦ How will ecosystem management contribute to meeting trust and treaty responsibilities to American Indian tribes?

These issues were critical to the development and analysis of the alternatives in the Draft EISs.

(See Chapter 1 of the Eastside and Upper Columbia River Basin Draft EISs for more details regarding significant issues.)

## Draft EIS Alternative Development

After the scoping periods for the Eastside and Upper Columbia River Basin EISs, public input was sought and used while EIS alternatives were being developed. In March 1995, the Eastside EIS Team solicited written comments on preliminary concepts used in developing themes for alternatives. The Eastside and UCRB EIS teams prepared a joint paper on goals for EIS alternatives. The paper was sent to all the people on a combined mailing list of more than 5,000 people. The teams received more than 140 responses. They used this information to help finalize a list of five goals in June 1995. The project goals are general statements of intent, and are carried forward, unchanged, to this Supplemental Draft EIS (see Chapter 3 for a list of project goals).

In August 1995, the EIS Teams sent another joint paper on themes for the alternatives to the people on their combined mailing list. The paper presented a final list of public issues, goals for alternatives, and planning criteria. Although feedback was not solicited, the EIS Teams received comments on the paper.

The National Environmental Policy Act requires that if a federal agency selects a preferred alternative that it be disclosed in a Draft EIS (NEPA, 40 CFR 1502.14). Before selecting a preferred alternative for the project Draft EISs, the project's Executive Steering Committee consulted with representatives from states, tribes, Resource Advisory Councils, Provincial Advisory Committees, and the Eastside Ecosystem Coalition of Counties. The Project's Executive Steering Committee met with most of these groups at least once throughout the summer and fall of 1996 to solicit their input.

## Public Briefings and Presentations (1994 - 1997)

### Project Briefings

Beginning in March 1994, periodic Project Update Meetings, were hosted by the Science Integration Team and the Eastside EIS Team. The purpose of these meetings was to provide an update on the progress of the science and EIS products, answer questions, and provide a continuing dialogue between the public and the project staff. Attendance



ranged from 40 to 100 people. Starting in January 1995, the Upper Columbia River Basin EIS Team joined the briefings. More than 20 Project Update Meetings were held from March 1994 to February 1997, in Walla Walla, Washington; Coeur d'Alene, Idaho; Missoula, Montana; and Boise, Idaho. Meeting content was made available to the public through an electronic library, local information binders, and by request.

### **Social Science Symposium**

The Science Integration Team's social science staff held a day-long symposium on the *Social Implications of Ecosystem Management* in Spokane, Washington in April 1995. The symposium, which was attended by 80 members of the public, provided an open forum for discussing the social aspects of the project.

### **Special Presentation**

Project staff gave more than 70 special presentations, in response to requests from other federal agencies, state, county, and tribal governments, forest and rangeland user groups, conservation and environmental organizations, professional societies, and civic organizations. More than 2,800 people attended the various presentations.

## **Sources of Project Information During Draft EIS Development (1994 - 1997)**

### **Mailing List, Newsletters, and Mailers**

The project staff created a mailing list of key contacts in January 1994, consisting of nearly 1,000 names. People whose names were on the list routinely received notices of upcoming meetings, newsletters, draft documents, and EIS mailers. Over time, the staff added the names of meeting participants and others who contacted the project offices. By the time the Draft EISs were published in 1997, the list had grown to more than 4,000 names.

The project communications staff publishes a periodic newsletter (initially titled *Eastside Edge* and later renamed *Leading Edge*), as a means of keeping people updated on the progress and contents of the Science Team and EIS efforts and documents. From February 1994 to June 1997, fifteen issues of the project newslet-

ter were published and distributed to all names on the combined project mailing list.

### **Project Information Binder**

In response to a request from the public that project information be available locally, the staff compiled and maintained up-to-date collections of science and EIS information, and distributed these to Forest Service and BLM offices and public libraries throughout the project area. The binders included general background on the project, meeting notes, draft science and EIS documents, and newsletters.

### **Electronic Library/ Internet/Toll-free Telephone Number**

In 1994, project information was made accessible to the public by means of an electronic library. In October 1995, the contents of the electronic library were made available on the Internet through the Forest Service Website system. Since then, the project staff developed its own website (<http://www.icbemp.gov>), where project information continues to be available. From early 1994 to 1996, the project maintained a toll-free telephone number. People calling this number were provided a menu of topic items which contained current information about the project.

## **Public Involvement Following Publication of Eastside and Upper Columbia River Basin Draft EISs**

On June 6, 1997, the Eastside and Upper Columbia River Basin Draft EISs were released for public review. This was formally announced with a Notice of Availability filed in the *Federal Register*. The Draft EISs were mailed to more than 2,500 people and made available electronically through the project's Internet website.

At the same time, the project also distributed two other publications designed to complement the Draft



EISs: *Considering All Things - Summary of the Draft Environmental Impact Statements and The Highlighted Scientific Findings of the Interior Columbia Basin Ecosystem Management Project*. These materials summarized the Draft EIS alternatives and the scientific findings concerning ecological and social/economic trends in the basin.

## Draft EIS Comment Period (June 1997 - May 1998)

Release of the Draft EISs initiated a formal 120-day comment period, originally scheduled to end on October 6, 1997. During the first two months of the comment period, people wrote numerous letters to the project requesting an extension of the comment period. Many requests cited the length and complexity of the EISs. In response to these requests, the project's Executive Steering Committee extended the comment period until February 6, 1998. In December 1997, they extended it again to April 6, 1998. This second extension was provided to give the public an opportunity to review and comment on a social-economics report, which was prepared in response to congressional request. The comment period was extended an additional 30 days to allow more time to review the report. In all, the period for public comment on the Draft EISs lasted 335 days, ending on May 6, 1998. Nearly 83,000 written responses were received from individuals, numerous interest groups, state governments, counties, and American Indian tribes during the comment period.

Public comments submitted in response to a Draft EISs are key factors in shaping a Final EIS and Record of Decision. The National Environmental Policy Act specifically directs federal agencies to "[r]equest comments from the public, affirmatively soliciting comments from those persons or organizations who may be interested or affected (NEPA, 40 CFR 1503.1)."

During the comment period for the Eastside and Upper Columbia River Basin Draft EISs, the project's Communications and EIS Teams actively sought to involve the public and solicit their input.

At the beginning of the public comment period, on July 9, 1997, the project broadcast an information-sharing teleconference from Boise State University to more than 60 communities across six states within the project area. The purpose of the broadcast was to introduce people to the content of the Draft EISs, and to provide an interactive opportunity for public involvement. Through the use of panel discussions and a pre-produced video, Executive Steering Committee members explained why there was a need for

agency action, what solutions were being proposed, and what the public could do to influence the outcomes. Nearly 1,000 people viewed the program. A forum for questions and answers was given through the use of telephone, fax, e-mail, and the Internet. Participants were able to send their questions to the broadcast studio at Boise State University, with the last 25 minutes of the 90-minute teleconference devoted to answering questions from viewers. Project staff released a report responding to those questions.

During July and August 1997, the EIS and Communications Teams sponsored nearly 40 public and employee meetings across the project area. The meetings provided an opportunity for open dialogue between project team members, agency employees, and the public.

Overall, more than 100 meetings were held in the project area during the comment period on the Draft EISs. Project staff met with interested citizens, Resource Advisory Councils and Provincial Advisory Committees, special interest groups, and Forest Service and BLM employee groups. The Executive Steering Committee participated in several tribal summits with American Indian tribes having interests and rights in the project area. A listing of public meetings is included at the end of this appendix.

Besides meeting with the public, the project published several issues of its *Leading Edge* newsletter to the people on the project mailing list, which by this time had grown to nearly 8,000 names. The newsletter served as a useful tool during this period for keeping the public informed about comment period extensions, various ways to submit comments, public meeting schedules, and other important project developments.

The 11-month comment period on the Draft EISs resulted in one of the highest volumes of responses from the public in the history of the Forest Service and BLM. The 83,000 responses came in from all 50 states and 58 countries. Letters, faxes, and electronic mail came from the general public, environmental organizations, resource-based industries, public land users, and representatives from federal, state, tribal and local governments.

The project hired a Forest Service team of analysts to categorize the comments, identify 19 major comment themes, and prepare a written summary of their findings. A full discussion of this process and the results of the team's analysis is presented in Appendix 4, Response to Comments.

More detailed information on the actual comments received during the comment period on the Draft EISs



is presented in the *Final Analysis of Public Comments for the Eastside and Upper Columbia River Basin Draft Environmental Impact Statements*, published in October 1998 (350 pages). A 25-page executive summary is also available. They can also be obtained from Icon Printing in Walla Walla, Washington, for approximately \$22, plus tax and shipping. Both documents can be found on the project website at <http://www.icbemp.gov>.

### Developing a Refined Approach (June 1998 - August 1999)

In addition to comments from the public, the project EIS Team received input from the project's Science Advisory Group (formerly called the Science Integration Team) and the Forest Service and BLM. Based on this combination of feedback and input, it became apparent by the summer of 1998 that a more integrated, coherent strategy was needed to address the issues than had been presented in the Draft EISs and to better accommodate local variations within the basin. In July 1998, the Executive Steering Committee redefined its design for the project, and the EIS Team began to develop an integrated ecosystem management strategy that would provide specific direction to address the broad-scale issues while also providing appropriate local flexibility.

While the project executives and EIS Team developed and refined the project design, the Communications Team continued to provide feedback to the general public. They used the project newsletter and periodic update meetings to describe how public comments were influencing change in the EIS, and what specific issues the project was working on in light of the comments. They involved the Resource Advisory Councils, Provincial Advisory Committees, tribes, states, and counties by periodically sharing information in detailed presentations, and they responded to requests for briefings from government agencies and congressional representatives. Within the agencies, at the field level, they worked to develop an understanding of the strategy by periodically briefing Forest Service and BLM employees.

### A Supplemental Draft EIS

In October 1998, Secretary of Agriculture Dan Glickman and Secretary of the Interior Bruce Babbitt signed a letter to the Pacific Northwest congressional

delegation, informing them of their decision to develop a new approach for the project and to issue a Supplemental Draft EIS for public comment. The Secretaries directed that the Supplemental Draft EIS focus only on critical, broad-scale issues (landscape health, aquatic and terrestrial habitat and socio-economics). The Secretaries' letter specified that the Supplemental Draft EIS would be developed "with full public involvement."

The Communications Team, Tribal Team and other project staff contacted (either through phone calls or face-to-face meetings) interested organizations and individuals, to brief them on the project's new focus and subsequent decision to prepare a Supplemental Draft EIS. In early December, 1998, "stakeholder meetings" were held in Missoula, Montana; Boise, Idaho; and Portland, Oregon to give a brief update on the Secretaries' letter, the strategy to move forward under a new focus, and to allow an opportunity for questions from the public. A project update meeting was also held in Walla Walla, Washington in early December 1998.

Periodic updates and briefings continued through 1999, while the EIS Team developed alternatives for the Supplemental Draft EIS. In April 1999, a working draft of Chapter 3 (management direction for three Supplemental Draft EIS alternatives) was completed for evaluation by the Science Advisory Group. While the scientists completed their analysis of the alternatives, project staff and executives made copies of the working draft available to Resource Advisory Councils, Provincial Advisory Committees, American Indian tribes, states, and counties within the project area as well as to the general public (upon request). Briefings on the refined approach and the working draft were given to interest groups, counties, Resource Advisory Councils, Provincial Advisory Committees, Congressional staff, and representatives of state government. Locations included: Portland, Eugene, Bend, and John Day, Oregon; Boise, Idaho; and Spokane, Washington.

Four issues of the *Leading Edge* newsletter were published while the Supplemental Draft EIS was being developed, and mailed to the approximately 7,400 names on the mailing list. The December 1999 issue provided information on salmon recovery initiatives underway in the interior Columbia Basin, and provided an update on the status of the EIS. The November 1998 issue briefly summarized the results of the public comment period and gave an overview of the project's refined approach. In the February and June 1999 issues, articles focused on specific features of the Supplemental Draft EIS.



## Next Step in the Public Involvement Process

Public comments and input played an extremely important role in the development of the Supplemental Draft EIS. The release of this Supplemental Draft EIS initiates a 90-day public comment period. Public review and input will be instrumental in shaping the Final EIS and Record of Decision.

Comments on this Supplemental Draft EIS should be sent to:

SDEIS  
PO Box 420  
Boise, ID 83702

## Briefings and Consultations Since the Release of the Draft EISs

Meetings, briefings, and consultations with numerous individuals, agencies and organizations were held throughout the development of the Supplemental Draft EIS. The following table lists significant contacts made since the Draft EISs were released in June 1997. The list is not exhaustive. Numerous internal briefings, collaborative intergovernmental working meetings, and one-on-one consultations with members of the public have also occurred.

### Acronyms used in this table:

CEQ	Council on Environmental Quality
DOJ	US Department of Justice
EECC	Eastside Ecosystem Coalition of Counties
EPA	Environmental Protection Agency
ESC	Executive Steering Committee
ICBEMP	Interior Columbia Basin Ecosystem Management Project
OMB	Office of Management and Budget
PAC	Provincial Advisory Committee
RAC	Resource Advisory Council

**Table 1. Meetings, Briefings, and Consultations.**

Date	Location	Contact/Meeting/Briefing
July 2, 1997	Walla Walla, WA	EECC Socio-Economic Subcommittee
July 9, 1997	60 locations in six states within the project area	Satellite teleconference
July 11, 1997	Boise, ID	Wilderness Society, Northern Rockies Campaign, Boulder-White Clouds, and Idaho Rivers United
July 12, 1997	Okanogan, WA	Forestry Roundtable
July 21, 1997	Polson, MT	ESC and Blackfeet Nation
July 21, 1997	Polson, MT	ESC and Confederated Tribes of the Colville Reservation
July 21, 1997	Polson, MT	Public Open House
July 22, 1997	Polson, MT	ESC and Salish and Kootenai Tribal Council
July 23-25, 1997	La Grande, OR	EECC

**Appendix 3: Public Involvement**

Date	Location	Contact/Meeting/Briefing
July 28, 1997	Usk, WA	Pulp and Paperworkers Resource Council
July 29, 1997	Spokane, WA	Public Open House
July 30, 1997	Lewiston, ID	Public Open House
July 31, 1997	Missoula, MT	Public Open House
Aug. 4, 1997	Idaho Falls, ID	Public Open House
Aug. 4, 1997	Salem, OR	Oregon Association of Counties
Aug. 5, 1997	Baker City, OR	Public Open House
Aug. 6, 1997	Burns, OR	Public Open House
Aug. 7, 1997	Bend, OR	Public Open House
Aug. 7, 1997	Bend, OR	Environmental Interest Groups
Aug. 13, 1997	Libby, MT	Public Open House
Aug. 14, 1997	Eureka, MT	Public Open House
Aug. 18, 1997	Wenatchee, WA	Public Open House
Aug. 19, 1997	Cle Elum, WA	Public Open House
Aug. 21, 1997	Usk, WA	Pulp and Plywood Association, Ponderay Newsprint Co.
Aug. 22, 1997	Salem, OR	Oregon Association of Counties
Aug. 23, 1997	Moscow, ID	Idaho Forest Congress Roundtable
Aug. 25, 1997	Lewiston, ID	Forest Industry Representatives
Aug. 25, 1997	La Grande, OR	Grande Ronde Model Watershed
Aug. 26, 1997	Pendleton, OR	Public Open House
Aug. 26, 1997	Naches, WA	Public Open House
Aug. 27, 1997	Walla Walla, WA	Project Update Meeting
Aug. 27, 1997	Walla Walla, WA	ESC and Columbia River Bioregion Campaign
Aug. 28, 1997	Helena, MT	Briefing, Montana Governor Racicot's Staff
Sept. 3, 1997	Portland, OR	Forest Service Employees for Environmental Ethics
Sept. 3, 1997	Portland, OR	Public Open House
Sept. 4, 1997	Portland, OR	Oregon Dept. of Fish and Wildlife
Sept. 9, 1997	Bonnars Ferry, ID	Public Open House
Sept. 11, 1997	Burley, ID	Upper Snake River RAC
Sept. 13, 1997	University of Idaho, North Campus	Idaho Forest Roundtable
Sept. 16, 1997	John Day, OR	Public Open House
Sept. 17, 1997	John Day, OR	John Day-Snake River RAC
Sept. 17, 1997	Walla Walla, WA	Eastern Washington County Commissioners
Sept. 17, 1997	Joseph, OR	People for the West
Sept. 17-19, 1997	Walla Walla, WA	Washington Association of Counties
Sept. 22, 1997	Walla Walla, OR	Grande Ronde Model Watershed Board
Sept. 22-25, 1997	Warm Springs, OR	Tribal Summit: Executive Steering Committee and Klamath, NW Band of Shoshone, Burns Paiute, Ft. McDermitt Paiute, and Shoshone tribes
Sept. 23, 1997	Kahneeta, OR	Public Open House
Sept. 25, 1997	Boise, ID	Project Update Meeting



Date	Location	Contact/Meeting/Briefing
Sept. 29-Oct. 1, 1997	Pocatello, ID	Tribal Summit: Executive Steering Committee and Shoshone-Paiute of Duck Valley, Summit Lake, Pit River, Ft. Hall, Ft. Bidwell, and Quartz Valley Tribes
Sept. 30, 1997	Pocatello, ID	Public Open House
Oct. 1, 1997	Challis, ID	Public Open House
Oct. 2, 1997	Salmon, ID	Public Open House
Oct. 7, 1997	Portland, OR	Northwest Power Planning Council
Oct. 7, 1997	Walla Walla, WA	EECC
Oct. 8, 1997	Thompson Falls, MT	Public Open House
Oct. 8, 1997	Walla Walla, WA	Public Utilities Council
Oct. 8, 1997	Helena, MT	Briefing, Montana Governor Racicot
Oct. 9, 1997	Portland, OR	Oregon Congressional Staff
Oct. 9, 1997	Sandpoint, ID	Public Open House
Oct. 9, 1997	Republic, WA	Washington Economic Redevelopment Team
Oct. 9, 1997	Boise, ID	Society for Range Management, Idaho Section
Oct. 9, 1997	Boise, ID	County Extension Agent for Owyhee County
Oct. 16, 1997	Boise, ID	The Wilderness Society
Oct. 17, 1997	Idaho City, ID	People for the West
Oct. 21, 1997	Walla Walla, WA	Project Update Meeting
Oct. 28, 1997	Mountlake Terrace, WA	Roundtable: Washington State Congressional Staff
Oct. 28, 1997	Colville, WA	Public Open House
Nov. 4, 1997	Boise, ID	Pacific Rivers Council
Nov. 5, 1997	Boise, ID	Lower Snake River RAC
Nov. 6, 1997	Elko, NV	Public Open House
Nov. 11, 1997	Boise, ID	Idaho County Commissioners
Nov. 12, 1997	Salmon, ID	Public Meeting
Nov. 13, 1997	Challis, ID	Public Meeting
Nov. 13, 1997	Boise, ID	People for the West
Nov. 18, 1998?	Boise, ID	Boise Cascade/CH2M Hill
Nov. 18, 1997	Spokane, WA	Spokane Chamber of Commerce Public Policy Forum
Nov. 24, 1997	Pendleton, OR	John Day-Snake River RAC
Nov. 24, 1997	Boise, ID	Idaho Congressional Staff
Dec. 1, 1997	Portland, OR	Tribal Summit: Secretary of the Interior Bruce Babbitt, Tribal Representatives, and Executive Steering Committee
Dec. 4, 1997	Spokane, WA	Northwest Mining Association - Government/Industry Breakfast
Dec. 5, 1997	Boise, ID	County Extension Agent for Owyhee County
Dec. 8, 1997	Plains, MT	Sanders County Commissioners
Dec. 8, 1997	Plains, MT	Public Open House
Dec. 10, 1997	Walla Walla, WA	EECC Meeting
Dec. 16, 1997	Boise, ID	Project Update Meeting
Dec. 17, 1997	Salem, OR	Oregon Salmon Strategy Team and Governor Kitzhaber
Jan. 13, 1998	Seattle, WA	The Mountaineers

**Appendix 3: Public Involvement**

Date	Location	Contact/Meeting/Briefing
Jan. 13, 1998	By Phone	Northeast Nevada RAC
Jan. 15, 1998	Spokane, WA	Eastern Washington RAC
Jan. 15, 1998	Okanogan, WA	Public Forum
Jan. 22, 1998	Bend, OR	Society of American Foresters, Central Oregon Chapter
Jan. 23, 1998	Elko, NV	Nevada RAC
Jan. 23, 1998	Pahrump, NV	Nevada State Public Lands Committee
Jan. 26, 1998	By Phone	Elko RAC
Jan. 26, 1998	Pendleton, OR	Southeastern Oregon RAC
Jan. 27, 28, 1998	Boise, ID	John Day-Snake River RAC
Feb. 10, 1998	Boise, ID	EECC, Forest Service Chief Dombeck and Members of Executive Steering Committee
Feb. 12, 1998	Boise, ID	EECC
Feb. 12, 1998	Boise, ID	Idaho Weed Control Association
Feb. 13, 1998	La Grande, OR	Governor Kitzhaber Forum on the Project
Feb. 16, 1998	Walla Walla, WA	Walla Walla Watershed Council
Feb. 19, 1998	Pendleton, OR	Subcommittee of John Day-Snake River RAC
Feb. 19, 1998	Winnemucca, NV	Public Forum: Project Staff and Humboldt County Commissioners
Feb. 20, 1998	Portland, OR	ESC/Tribal Working Group
Feb. 21, 1998	Dayton, WA	Columbia County Farm Bureau
Feb. 26, 1998	Hamilton, MT	Public Open House
March 2, 1998	College Place, WA	Walla Walla College
March 5, 1998	College Place, WA	Walla Walla College
March 6, 1998	Elko, NV	Nevada Legislative Committee on Public Lands
March 6, 1998	Scottsdale, AZ	Briefing, American Bar Association
March 16, 1998	Stanley, ID	Public Open House
March 16, 1998	Spokane, WA	Washington Legislative Committee
March 18, 1998	Walla Walla, WA	Society of American Foresters
March 18, 1998	Walla Walla, WA	Project Update Meeting
March 20, 1998	Portland, OR	Project Staff, EECC Subcommittee
March 24, 1998	Fort McDermitt, NV	Project Tribal Liaison and Fort McDermitt Tribe
April 1, 1998	Missoula, MT	University of Montana
April 14, 1998	Washington D.C.	Hearing: House of Representatives
April 16, 1998	Boise, ID	Project Update Meeting
April 20, 1998	Chiloquin, OR	Project Tribal Liaison and Klamath Tribe
April 21, 1998	Portland, OR	States of Washington and Oregon
April 30, 1998	Reno, NV	American Forest and Paper Association, National Forest Planning Committee
May 5, 1998	Toppenish, WA	Catholic Bishops Steering Committee
May 12, 1998	Pasco, WA	American Pulp Association, Forestry and Environmental Committee
May 15, 1998	Richland, WA	American Paper Association Panel Discussion
May 15, 1998	Spokane, WA	ESC/Tribal Working Group



Date	Location	Contact/Meeting/Briefing
May 19, 1998	Seattle, WA	Public Forum Sponsored by EPA and the Mountaineers
May 20, 1998	Walla Walla, WA	Project Update Meeting
May 28, 1998	Okanogan, WA	Okanogan Watershed Council
May 28, 1998	Boise, ID	Northwest Power Planning Council
May 28, 1998	Spokane, WA	US Senate Field Hearing
June 15, 1998	Portland, OR	ESC/Tribal Working Group
June 16, 1998	Heppner RD, OR	Field trip, Project Staff and Oregon Congressional Staff
June 25, 1998	Portland, OR	Intertribal Timber Council
June 26, 1998	Wenatchee, WA	Washington Extension Agents' and Specialists' Association
July 20, 1998	Lewiston, ID	ESC/Tribal Working Group
July 29, 1998	Walla Walla, WA	Project Update Meeting
July 29, 1998	Olympia, WA	Roundtable: Western States Land Commissioners
July 29-30, 1998	Wenatchee, WA	Western Planners/Planning Conference
Aug. 15, 1998	Boise, ID	Society of American Foresters
Sept. 14, 1998	Portland, OR	ESC/Tribal Working Group
Oct. 21, 1998	Portland, OR	Briefing, Governors of Oregon and Washington staffs
Nov. 2, 1998	Boise, ID	ESC/Tribal Working Group
Nov. 12, 1998	Boise, ID	Wilderness Society and Pacific Rivers Council
Nov. 18, 1998	Pendleton, OR	John Day-Snake River RAC
Dec. 3, 1998	Missoula, MT	Regional Stakeholders Meeting
Dec. 7, 1998	Portland, OR	Environmental Interest Groups
Dec. 8, 1998	Portland, OR	Forest Service Employees for Environmental Ethics
Dec. 7-8, 1998	Portland, OR	Regional Stakeholders Meeting
Dec. 9, 1998	Boise, ID	Regional Stakeholders Meeting
Dec. 10, 1998	Pendleton, OR	Joint RAC/PAC meeting
Dec. 11, 1998	Spokane, WA	Idaho/Washington Congressional Staff
Dec. 11, 1998	Portland, OR	Oregon Congressional Staff
Dec. 14, 1998	Walla Walla, WA	Project Update Meeting
Dec. 17, 1998	Portland, OR	ESC/Tribal Working Group
Jan. 14, 1999	Portland, OR	EECC Members from Washington and Oregon
Jan. 14, 1999	Boise, ID	Rotary Club
Jan. 15, 1999	Portland, OR	Science Advisory Group/Tribal Staff
Jan. 25, 1999	Richland, WA	Battelle - Pacific NW National Laboratory
Feb. 9, 1999	Boise, ID	EECC
March 2-3, 1999	La Grande, OR	John Day-Snake River RAC
March 18, 1999	Spokane, WA	Eastern Washington RAC
March 18, 1999	Boise, ID	Briefing, Idaho Association of Counties
April 1, 1999	Washington, DC	ESC Briefing, Council on Environmental Quality, Office of Management and Budget, and the Department of Justice
April 6, 1999	Boise, ID	National Wildlife Federation, American Lands Alliance
April 8, 1999	Portland, OR	Briefing, EECC

**Appendix 3: Public Involvement**

Date	Location	Contact/Meeting/Briefing
April 12, 1999	Boise, ID	Briefing, Idaho Congresssional Staff
Apr. 16, 1999	Twin Falls, ID	Upper Snake River RAC
Apr. 20, 1999	Boise, ID	Briefing, Idaho Governor Kempthorne's Staff
Apr. 21, 1999	Fort Hall, ID	Tribal Liaison Briefings, Shoshone-Bannock Tribes
Apr. 22, 1999	Boise, ID	Briefing, The Wilderness Society
Apr. 26, 1999	Helena, MT	Briefing, Montana Governor Racicot
Apr. 29, 1999	La Grande, OR	Briefing, John Day/Snake River RAC
Apr. 28, 1999	Burns, OR	Briefing, Southeastern Oregon RAC
May 3, 1999	Blackfeet Reservation	Tribal Liaison Briefings, Natural Resource Staff, Blackfeet Reservation
May 4, 1999	Pablo, MT	Tribal Liaison Briefings, Confederated Salish and Kootenai Resource Staff
May 5, 1999	Boise, ID	Briefing, Lower Snake River RAC
May 11, 1999	Portland, OR	Briefing, Oregon Governor Kitzhaber's Staff, Environmental Groups
May 14, 1999	Spokane, WA	Briefing, Washington and Idaho Congressional Staffs
May 17, 1999	Eugene, OR	Briefing, Oregon Congressional Staffs
May 20, 1999	Lapwai, ID	Five Forest Meeting: Project Tribal Liaison, Nez Perce Tribe Representative, and Forest Supervisors from the Nez Perce, Clearwater, Payette, Wallowa-Whitman, Umatilla National Forests
June 3, 1999	John Day, OR	Briefing, John Day Community Leaders
June 4, 1999	John Day, OR	Briefing, John Day-Snake RAC
June 8, 1999	Boise, ID	Briefing, Idaho Governor Kempthorne's Staff
June 22, 1999	Portland, OR	Joint RAC/PAC Meeting
July 8, 1999	Pasco, WA	Multi-Species Framework Meeting
July 12, 1999	Spokane, WA	Timber Industry Representatives
July 20, 1999	Enterprise, OR	Hell's Canyon area County Commissioners & Congressional Staff
September 9, 1999	Pendleton, OR	John Day-Snake RAC
September 24, 1999	Prineville, OR	Briefing, Deschutes PAC
October 25, 1999	Redmond, OR	Briefing, Deschutes National Forest Management Team



# Appendix 4

## Response to Comments

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# Introduction

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On June 6, 1997, the Eastside and Upper Columbia River Basin Draft Environmental Impact Statements (EISs) for the Interior Columbia Basin Ecosystem Management Project (project) were released for public review, initiating a formal 120-day comment period. The comment period was extended several times and lasted a total of 335 days, ending on May 6, 1998.

Approximately 82,895 letters and internet responses were received. The comments were recorded and consolidated by the Content Analysis Enterprise Team, an independent content analysis team made up of federal employees. Contracting with this team was done to promote an objective and consistent approach to the content analysis process.

The comments were read and coded based on content and intent and then re-read and coded by an additional analyst to reduce subjectivity and promote consistency in coding. Each comment received was given a unique tracking number and entered into a database. The public comments were then categorized and summarized by the Content Analysis Enterprise Team, and reported in the *Final Analysis of Public Comment for the Eastside and Upper Columbia River Basin Draft Environmental Impact Statements* (October 1998).

Of the total responses received, approximately 77 percent were from outside the project area. Within the project area, Idaho residents submitted the majority of responses. All but 930 of the 82,895 responses were submitted by individuals or families. The remaining 930 were submitted by a variety of organizations including: interest groups; businesses;

federal, state; county, and local government agencies; elected officials; tribal governments; and professional societies.

Approximately 77,460 of the 82,895 responses received were from organized response campaigns and included: petitions, postcards, resolutions, comment forms, electronic mail messages, and form letters.

Approximately 38 different types of organized responses were received. The majority of these organized responses (69,800) were coordinated by Working Assets and the Northern Rockies Campaign.

Every comments was considered, regardless of whether it was one comment repeated by thousands of people or a comment submitted by only one person. The emphasis was placed on the *content* of the comment rather than on the *number of times* a comment was received. Input generated during the comment period does not constitute a statistically valid random sample of the public's views, nor does it necessarily reflect broader societal values or trends.

See Appendix 3 for more detail on the project's public involvement process.

The results of the content analysis were critical to the development of the Supplemental Draft EIS. Following are the consolidated comments and the responses developed by the project staff. They are divided into three major topic areas: comments related to the proposed action and purpose and need statement, comments related to biophysical components of the ecosystem, and comments related to social-economic-tribal components of the ecosystem.



# Proposed Action, Purpose and Need

## Purpose and Need

**Comment:** The EIS cannot fulfill the purpose and need for various reasons, including:

- ♦ the EIS will not assure a sustained and predictable level of products and services.
- ♦ the EIS will not restore long-term ecological health and biological diversity.
- ♦ the purpose and need statements are incompatible: resource protection and economic/social development appear to be unrelated or contradictory; the balance between ecosystem integrity and economic health should be revisited.

**Narrative:** *Many respondents assert that the EIS as written cannot fulfill its purpose and need for various reasons. People who are dependent on timber from federal lands, for example, feel the EIS will not assure a sustainable and predictable level of products and services. They feel that this uncertainty will jeopardize their jobs, families, and the stability of their communities. They feel the EIS not only predicts decreased timber harvest levels, but also fails to quantify how severe these decreases may be. They say the Draft EISs alternatives were ranked by the amount of timber to be harvested but don't specify allowable sale quantities. Some say that although the Draft EIS contains standards for the purpose and need of restoring long-term ecosystem health and integrity, they believe that there are no standards for the health and integrity of their livelihoods. Others feel that ecosystem health or recreation are only 'value-based' estimates which should not take precedence over quantifiable economic values.*

*Some feel that the two parts of the purpose and need (resource protection and economic/social development) should be integrated to demonstrate the compatibility of seemingly divergent resource uses. Other respondents believe that economics and ecosystem management are exclusive of each other. Some perceive an emphasis in the Draft EISs on economic goals, dealing with commercial and extractive practices, which cannot function at the ecosystem level. Others feel that capitalism, based on competition, cannot accommodate a healthy environment (see also Ecosystem Management).*

*Some hold the view that the methods called for in the various alternatives, will not accomplish the on-the-ground work to restore forests, grasslands, wildlife habitat and aquatic resources (see also Range of Alternatives).*

**Response:** Long-term and short-term predictability of outcomes is discussed in Chapter 4 and was discussed in Chapter 4 of the Draft EISs, page 190. Long-term predictability is expected to increase because the intent of the alternatives in the Supplemental Draft EIS is to lead to ecological systems with more predictable and less extreme disturbance regimes, providing for more predictable human uses. An increase in long-term predictability should increase long-term stability to individuals, families, and communities. The preferred alternative should have a better chance than current land use plans of being implemented because it will provide a land-use strategy more responsive to social values that can be implemented at a cost in line with historical funding; therefore, it is more likely to be funded and more likely to provide goods and services as projected. Short-term predictability may be less secure as a consequence of managing for more predictable disturbance regimes and as a



consequence of implementing a new management strategy that departs from current practices. Allowable sale quantities for timber will be established at the local level (that is, at the Forest Plan or Resource Management Plan level). A dollar value has not been assigned to ecosystem health, but it is essential to long-term predictability of products that do have a quantifiable economic value.

The two parts of the statement of need (resource protection and economics/social development) are linked. Ecological integrity and ecosystem health are tied together with social and economic health and integrity. Providing for human uses and values must be consistent with maintaining healthy, diverse ecosystems, because livelihoods that are based on natural resources depend, for sustainability and predictability, on the ecological health and integrity of those resources. Chapter 1 has been clarified to reflect this intended meaning.

Standards have been refined, rewritten, and streamlined throughout Chapter 3 of the Supplemental Draft EIS so that they are more understandable and, therefore, more enforceable. The discussion of the effects of the alternatives in Chapter 4 documents the degree to which each alternative would be effective in restoring ecosystems if implemented. A monitoring plan will be developed before the Record of Decision is signed to track implementation, ensure accountability, and identify where management changes are needed because effects are not what was expected.

**Comment:** The EIS should not defer to National Forests/BLM Districts or other subregional levels decisions that could limit the agencies' ability to achieve the purpose and need.

**Narrative:** *Some people feel that the planning process contains inherent problems that will block the agencies' ability to fulfill their congressional mandate. They assert that timber harvest levels and other commodity production levels cannot be predicted until Forest Service and BLM land use plans are revised. In addition, they worry that continued Ecosystem Analysis at the Watershed Scale (EAWS) will only delay on-the-ground decisions. Others feel that adaptive management is another delay tactic and will only increase uncertainty about their future. They feel that complex and conflicting standards and objectives in the EIS will delay implementation, as will current policies, regulations, and a possible lack of funding (see also Ecosystem Analysis at the Watershed Scale (EAWS), Priorities).*

**Response:** Existing land use plans provide the management foundation for the lands administered by the Forest Service and BLM in the project area. Much of that foundation, especially the finer-scale

direction, will remain unchanged by the Record of Decision. The hierarchy of management, together with the step-down process for bringing broad-scale direction down to the local level (by district or national forest), are intended to meet the need for a well-defined plan amendment and implementation process.

Standards have been refined and streamlined for alternatives S2 and S3 in the Supplemental Draft EIS. A monitoring plan will be developed before the Record of Decision is signed to track implementation, ensure accountability, and identify where management changes are needed.

**Comment:** The EIS should include aquatic species recovery goals in the Purpose and Need Statement.

**Response:** The purpose and need for the EIS was defined prior to development of the Draft EIS or Supplemental Draft EIS and has not changed. Species recovery goals are covered in the purpose and need statement by: "restore and maintain long-term ecosystem health and ecological integrity"; and "restore and maintain habitats of plant and animal species, especially those of threatened, endangered and candidate species"; and "provide long-term, broad-scale management direction to replace interim strategies (PACFISH, INFISH, and the Eastside Screens)."

## Proposed Action

### Ecosystem Management

**Comment:** The Draft EIS should use a clear, scientific definition of ecosystem management.

**Narrative:** *Noting the complex and diverse definitions of the word ecosystem, some wonder how decision-makers will agree upon a suitable definition, not to mention develop a plan to manage such a system. Several interpret ecosystem management as a vague, arbitrary, ill-defined and therefore inappropriate cornerstone for a proposed action of this magnitude. The concept of an ecosystem, some state, is not based on scientific theory but social, political, philosophical, or religious values.*

*Some feel the vague terminology allows planners and managers to fit their actions to any Record of Decision they choose. Quoting several government officials who have noted the lack of a precise definition for 'ecosystem' or 'ecosystem management,' many people question whether a*



*document that relies on these concepts can ever attain the needed clarity, authority, and freedom from future gridlock, confusion and litigation.*

**Response:** The definition of Ecosystem Management in the Draft EIS and Supplemental Draft EIS was derived from *A Framework for Ecosystem Management in the Interior Columbia Basin* published by the Science Integration Team in June 1996. It is a peer-reviewed scientific definition and provides a clear, common concept for scientists, agency managers, and field staff in both the Forest Service and BLM to use in understanding and implementing the direction in the preferred alternative of the Supplemental Draft EIS.

**Comment:** The EIS should better define and clarify the management emphasis terms of Conserve, Restore, Produce for the forest and range clusters. There needs to be a clearer distinction between Restoration and Conservation that will give clear guidance to managers prioritizing projects.

**Narrative:** *Some respondents feel that the definitions of management emphasis (Conserve, Restore, Protect) are so blurred and overlapping that they do not adequately differentiate among the management options. Other respondents suggested that they believe the emphasis [categories] really are meant to convey particular conservation and restoration management activities that are consistent with wilderness and other areas that are currently "closed to resource use." Others feel that restoration should be defined by activity types and separated out from resource development (logging and grazing) to avoid public misunderstanding.*

**Response:** Definitions for Conserve, Restore, and Produce were included in sidebars in the Description of Alternatives (Chapter 3) of the Draft EISs and in the glossary. The concept of forest and range clusters was used for description and analysis in the Draft EISs. Management emphasis has been refined in the Supplemental Draft EIS, eliminating the Conserve, Restore, Produce terminology. The use of clusters to specify management areas has been replaced by the Resource Advisory Council and Province Advisory Committee areas in the Supplemental Draft EIS in response to this and similar comments.

**Comment:** The EIS needs to establish legal justification for using ecosystem management concepts.

**Narrative:** *Many assert that no legal authority or congressional mandate exists for the use of the concept of ecosystem management in management plans. Some warn that the size of the project area and the lengthy time frame*

*of the project put too much at risk with a plan that stresses such an unproven and nebulous concept. At least one respondent calls ecosystem management a tool to achieve goals rather than a goal in itself, and therefore dismisses the concept as inappropriate for a statement of proposed action.*

*The legality of ecological health as a goal for the plan is problematic for many respondents. They point out that long-standing laws and policies relating to multiple-use require a balance of resource goals. They say that placing ecosystem health above all other considerations may violate such laws (see also Restoration, Ecosystem Management).*

**Response:** Chapter 1 of the EIS describes a number of directives and commitments made through interim direction that provide requirement or authority for permanent, ecosystem-based management direction. A number of current laws governing management of federal lands—including Federal Land Policy and Management Act, National Forest Management Act, Endangered Species Act—as well as court decisions support this ecosystem-based management approach as a tool to achieve management goals. These laws are summarized in Appendix 1.

**Comment:** Public comments diverge on whether ecosystem management should more strongly emphasize economic and social needs of humans or protection and management of natural resources.

**Narrative:** *Many commenters feel the role of humans and their economic and social health are ignored by the definitions of ecosystem health. They assert that humans are part of the ecosystem, but that the EISs' various definitions of ecosystem health fail to consider people in the equation. Some perceive a biocentric, anti-human, or nature-knows-best bias in the project, placing the well-being of other life forms ahead of the interests of humans. With ecosystem health as the stated goal, some foresee economic disaster for people, companies, and towns that depend on commodities produced by public lands. (see also Purpose and Need).*

**Response:** The Supplemental Draft EIS contains a specific socio-economic component to the ecosystem management strategy in both Alternatives S2 and S3. The project charter, purpose and need statement, EIS goals, and specific direction from the Secretaries of Agriculture and Interior all state that the Record of Decision will include social and economic factors as a part of ecosystem management. The *Framework for Ecosystem Management for the Interior Columbia Basin* shows that socio-economics is a part of ecosystem management. The discussion of ecosystem health in Chapter 1 includes providing products and places for people as part of the definition.



**Comment:** Ecosystem management and multiple-use mandates under the Multiple-Use/Sustained Yield Act of 1960 may not be compatible.

**Narrative:** *Some respondents strongly suggest that the protection of ecosystem health and integrity "above all other factors" is fundamentally inconsistent with existing multiple-use laws. They suggest that the measure of integrity should be the ability to provide multiple-use "outputs," and that the weak references to human and economic welfare in the Draft EISs are "purposefully deceitful rhetoric crafted to obscure that the project is designed to ultimately end the legitimate and productive non-recreational use of public lands." They see all alternatives as increasing uncertainty for timber producers, which they feel contradicts the cornerstone (predictability) of multiple-use management of federal lands. A "radical departure" from multiple-use management to "a new, untested method" is seen as leading to a drastic reduction in future levels of output and profound economic and social impacts to all communities in the project area. By incorporating new objectives for ecosystem management and establishing ecosystem health and ecological integrity, some feel that the project is violating the Forest Service mandate under the Multiple-Use/Sustained Yield Act to establish and administer lands for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.*

*Others who favor ecosystem management insist that providing multiple human benefits must be done within the capabilities of the ecosystem and the limitations of ecological integrity, health, and diversity. They feel that while multiple use may be valid to assure a consideration of various resource uses, most multiple-use management to date has not provided for conservation of salmonid habitats and other resources. These respondents want the EIS to ensure that the first priority for any multiple use of these federal lands is to ensure the health of biological diversity.*

**Response:** The use of an ecosystem management approach to achieve ecological integrity is not only compatible and in compliance with the mandates of the Multiple-Use/Sustained Yield Act of 1960 (MUSY) and Federal Land Policy and Management Act of 1976 (FLPMA), but it is considered to be necessary in the interior Columbia Basin to "adjust to changing needs and conditions," as the law requires, and to resolve management issues across this large area. Section 4 of the MUSY states that "'multiple use' means the management of all the various renewable surface resources, outdoor recreation, range, timber, watershed, and wildlife and fish purposes of the National Forests....and harmonious and coordinated management of the various resources... without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or

the greatest unit output." Multiple-use outputs of various resources, as defined by the law, are to be provided only within the context of ecologically unimpaired (healthy) lands.

Section 102 of FLPMA states it is the policy of the United States that management be on the basis of multiple use and sustained yield. "Multiple use" is defined in FLPMA as "...the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output."

## Ecosystem Health and Ecological Integrity

**Comment:** Ecosystem health and ecological integrity should have quantifiable definitions to provide a real basis for comparison to understand the conditions described in the EISs.

**Narrative:** *The perceived lack of any solid definition for 'ecological health' or 'ecological integrity' causes concern for many, who believe there is no meaning for such terms that can pass peer-review. Some note the absence of clear definitions will necessitate a reliance on subjectivity and inexact science. These respondents call for quantitative and absolute data regarding the health of the area, and they warn against the use of social sciences, "soft science," and jargon. Some feel that by definition it is impossible to determine if the need for ecological integrity is addressed or matches the range of alternatives because absolute measures do not exist. Some feel that the language of the ecological sciences is deliberately vague so that government officials can take whatever action they like, and then justify it with "bureaucratic jargon and the nebulous notion of ecosystem health" (see also Ecosystem Management).*



**Response:** Definitions of ecosystem health and ecological integrity used for this project were developed by the Science Integration Team (SIT) and underwent peer review. As discussed in Chapter 2 of the Draft EISs, ecological integrity was estimated in a relative sense because of the acknowledged difficulties in measuring it directly. "Proxies" or representative processes and functions were used to estimate where integrity was considered to be higher or lower than other places. The SIT determined that these "proxies" were sufficient to measure and evaluate the relative performance of the various alternatives presented in the EIS with regard to ecosystem health and ecological integrity.

**Comment:** Public comments diverge on whether active management degrades or improves ecosystem health, and, therefore, to what degree management should be active or passive.

**Narrative:** *While many people concur there is a need to address forest health in the project area, opinions diverge on whether active management would improve or degrade the situation and on the level of activity needed. Some individuals feel the issue of what actually constitutes a healthy forest was not adequately addressed in the Draft EISs. Some feel that less active management should be proposed, especially in unroaded areas; others asked that more active management be implemented to address declining forest health in a manner benefitting local economies dependent on management activities such as timber harvesting. In the opinions of many, public lands within the interior Columbia River basin require restoration, especially lands on which a long history of management activities such as logging, grazing, mining, and road building have damaged ecosystem health. There is disagreement, however, on the level and type of management activities people feel should be a part of the restoration efforts.*

**Response:** The alternatives presented in the Supplemental Draft EIS (Chapter 3) provide for a balance between the two management techniques; the degree and intensity vary among the alternatives. All three alternatives contain a variety of active and passive management activities, outlined in the objectives, standards, and guidelines (Chapter 3), that meet the Purpose and Need of the project.

Alternative S1 (No Action Alternative) continues current management, which includes the interim direction as the long-term strategy for federal lands in the project area. Alternatives S2 and S3 focus on restoring and maintaining ecosystems and providing for the social and economic needs of people. Alternatives S2 and S3 differ on the level of acceptance of short-term risk: Alternative S3 accepts more short-term risk, as is acceptable within the require-

ments of the Endangered Species Act, Clean Water Act and Clean Air Act. For example, passive management is emphasized in the short-term in aquatic A1 subwatersheds and source habitat in terrestrial T watersheds in both Alternatives S2 and S3; while active management is emphasized in subbasins identified as being high priority for restoration at the broad-scale.

## Restoration

**Comment:** Restoration does not provide enough timber management direction.

**Narrative:** *Some respondents acknowledge the need for a primary focus on restoration work but they do not understand why there is no additional direction for timber management aside from restoration. They feel that multiple-use objectives, particularly timber production, should be treated as equal objectives to be achieved through the Interior Columbia Basin Ecosystem Management Project strategy, and not just restoration.*

**Response:** Timber harvest is an important part of restoration and of the economic strategy. Long-term sustainable levels of timber harvest depend on healthy forests from which to harvest trees. Therefore, management direction which improves the long-term health of the landscape including forests, improves the long-term sustainability and predictability of timber supplies. Several base-level and restoration objectives address the need for timber harvest from an economic standpoint. Although they may not specifically mention timber harvest, it is one of the "goods and services." For example: the Supplemental Draft EIS states "Derive social and economic benefits, promote commercial activity, and foster demand for labor and capital formation through producing a variety of goods and services from Forest Service- and BLM-administered lands according to land management plan allocations and management direction."

This is also reflected in the base level Social-Economic-Tribal Component description and management intent where it says "major areas of focus... include... management direction that emphasizes the production of commercial products or services from Forest Service- or BLM-administered lands..." Similar language can be found in the description and management intent under the Products and Services from Public Lands and Support Economic and Social Needs of Communities and Cultures Sections of Chapter 3 of the Supplemental Draft EIS.

Although there are fewer objectives and standards addressing the production of goods and services



compared with restoration, this does not mean production of those goods and services are any less important. More management direction on production of goods and services could be redundant.

**Comment:** The EIS should clearly state what restoration methods will be used and how restoration activities will be prioritized. The distinction between 'restoration' and 'conservation' needs to be clarified to give clear guidance to managers prioritizing projects.

**Narrative:** *Respondents requested that the specifics of restoration methods be clearly stated and supported scientifically. They want to see further analysis demonstrating that improved conditions can be reasonably predicted for species that rely on those habitats. They feel that alternatives for accomplishing restoration need to offer different concrete approaches to the challenge, prescribe limits on experimental logging-based approaches, and set up rules or standards for choosing among restoration techniques in different ecological circumstances.*

*Some recommend prioritizing where restoration activities would be most cost effective; they think restoration activities should be prioritized during subbasin review and Ecosystem Analysis at the Watershed Scale (EAWWS), and restoration should focus on first securing strongholds and currently productive habitats at risk. Some respondents feel that a "real" restoration alternative would focus on watershed and terrestrial restoration in areas of high ecological potential but low ecological integrity as identified by the Science Integration Team.*

**Response:** From a broad-scale perspective, subbasins have been identified in the Supplemental Draft EIS as high priority for restoration, from a functional and an integrated aspect. These high priority areas are where restoration would be most effective. In addition, the Supplemental Draft EIS identifies source habitat for families or groupings of terrestrial species. A restoration objective is to restore terrestrial source habitats to provide for species needs. Tables in Chapter 3 identify which source habitat, in terms of cover type and structural stages, need to be increased (in extent and connectivity) for the various terrestrial families. Broad-scale priority for restoration is identified by Resource Advisory Council/Provincial Advisory Committee area. Guidelines suggest specific restoration techniques to consider for different ecological circumstances. The analysis of projected success of restoration is found in Chapter 4.

Another restoration objective is to use broad-scale aquatic/riparian restoration opportunities and the geographic extent of the A1/A2 network during Subbasin Review. This will provide context when

developing local long-term restoration opportunities and priorities. The first consideration for aquatic/riparian restoration priorities is securing A2, and as needed A1, aquatic areas from internal or adjacent subwatershed risks. A1 and A2 subwatersheds represent areas that support the strongest fish populations and highest native diversity and integrity.

## Subbasin Review

**Comment:** Subbasin reviews will take longer than the two to three weeks as described in the EISs. The subbasin review process should either be simplified and clarified, or the time frame should be made more realistic.

**Narrative:** *Because Subbasin Reviews would involve large amounts of complex data and coordination among government agencies and tribes, some people question the assertion these reviews will take only two to three weeks to complete. Some respondents recommend the EIS Team define the desired outcomes of subbasin review rather than pre-determining that they will take three weeks to complete. Others noted that the time required to evaluate the information contained in subbasin reviews needs to be recognized as an early planning requirement. Some feel that the chance to identify meaningful, realistic opportunities is limited if the review is intended to be brief and to use only existing information. More guidance on what subbasin review entails and the methodology to be used is requested by some.*

*Many feel the quantity and types of data available are problematic as validation tools. For example, they state that new mid-scale data may reveal little about existing broad-scale data, not to mention data that is estimated from limited samples or is anecdotal. They feel that inconsistencies in the nature of data required by the Subbasin Review process lengthen the time needed to approve implementation of management activities. If any information is not correct, people predict that new valid data will take a long time to gather. Some specifically ask that the validation process to be used be clarified.*

*A few note that Subbasin Reviews will cross jurisdictional boundaries and private property, which they feel creates a problem. Some propose reviews and authorization by BLM state directors or Forest Service regional foresters, or by local managers under the auspices of approved land use plans. Others want better guidance and latitude for local managers to coordinate across administrative boundaries.*

**Response:** Subbasin Review (SBR) is intended to be a concentrated review and validation of broad-scale science data, in part to see whether more detailed analysis is needed. It is intended to take place in a



relatively short period of time depending on the complexity of the area and the issues to be analyzed; it is possible that the process could take longer in some situations. The concentrated work time devoted to assembling and displaying review area information should be about four to eight weeks for core team members; the start-to-finish review should be maintained within a six-month time period.

A Subbasin Review Guide has been developed and is intended to provide guidance for SBR, similar to that provided in the *Federal Guide for Watershed Analysis*. Public review and participation in SBR is discussed in the Subbasin Review Guide.

Requirements for SBR have been re-written in an attempt to clarify them and to respond to comments on the Draft EIS. Management intent has been added to augment the direction for SBR, with standards that SBR shall be conducted according to the Subbasin Review Guide; subbasins with less than 5 percent BLM/Forest Service ownership or where collaborating partners agree the intent has already been met are exempt from SBR; in Alternative S2, SBR for subbasins identified as broad-scale integrated priority for restoration shall be completed within 2 years; other required SBR under Alternative S2, and all required SBR under Alternative S3 shall be completed within 5 years.

**Comment:** Public comments diverge on when subbasin reviews should be completed. Some feel they should be completed prior to signing the Record of Decision (ROD), while others feel that whenever they are completed they shouldn't delay management activities.

**Narrative:** *Unless there are compelling reasons, some feel that on-the-ground projects should not have to wait for completion of subbasin reviews, especially in areas where similar reviews have already addressed project issues. People do not want to see lengthy delays in more ecologically complex areas and want local agency managers to have authority to continue activities without completion of subbasin reviews. They feel that forests and rangelands, wildlife, water, and other resources, and people who depend on commodities from public lands, will suffer from management delays. Some feel that the EIS should state clearly that previously approved actions and ongoing activities may continue at current or increased levels. Some are concerned that funding is not available to shut down a third of the forest and rangelands for a year to do lengthy subbasin reviews while also trying to do ongoing programs.*

*An opposing view is that no management activity should take place until subbasin reviews have been completed. Some respondents interpret the direction to mean that no*

*management activities will occur during the first year of plan implementation and request that this statement be clearly stated or refuted in the EIS. Others feel that subbasin review should have been accomplished as part of the Draft EISs, stating that they are necessary for the public and decision makers to understand components and implications of various alternatives.*

**Response:** As noted in other responses, Subbasin Review (SBR) is intended to be a concentrated review and validation of broad-scale science data, in part to see whether more detailed analysis is needed. We do not expect this review to significantly delay future on-the-ground projects. The SBR process will help in identifying areas for future management activities in the context of the Selected Alternative. Projects that have been approved and are being implemented, will be considered during the SBR, but it is not the intent of the SBR to prohibit resource management activities from occurring prior to completion of the review.

**Comment:** Category 1 subbasins should be used as models.

**Narrative:** *It was recommended that an additional status be given to Category 1 subbasins, which are said to be currently successful in managing for positive ecological status. Respondents suggest that these subbasins should be designated as "adaptive management models" and given a "demonstration" status so that the success in management can be adapted for use in other areas.*

**Response:** In this EIS, management direction is no longer directly tied to subbasin categories. Subbasin category information was used in this EIS to assist in identifying broad-scale integrated restoration opportunities in Alternatives S2 and S3. In Chapter 3, the adaptive management section describes how the Forest Service and BLM will design and locate areas for experimentation and field trials to accelerate learning.

**Comment:** There is a need for clear guidance to administrative units on implementation of subbasin reviews in the first three years, and a need for assurances that the results of the subbasin review process will be used to direct land management planning during project implementation. Standard EM-S1 in the Draft EISs is contradictory, suggesting that management activities can occur with or without completion of subbasin reviews.

**Narrative:** *Some respondents believe that standard EM-S1 in the Draft EISs does not provide an adequate prioritization system for designating which areas would go through subbasin review in the first three years. They feel*



*that this standard should spell out the progression from broader to finer scales of information. Others suggest that EM-S1 as written may result in inappropriate prioritization of subbasin review and avoidance of some subbasins in the first year so that activities can proceed. They recommend that an interagency prioritization schedule be developed for the selected alternative, and that it include a description of what information must be included in a subbasin review, at what scale, and at what level of detail. They also suggest development of a certification and monitoring process to obtain quality assurance of step-down analysis products and use of analytical results.*

*Others feel that the standard does not provide an adequate understanding of how the information among subbasin reviews will be shared in order to set priorities at a larger scale; they suggest that the direction for subbasin review be as clear as the Federal Guide for Watershed Analysis.*

**Response:** Requirements for Subbasin Review (SBR) have been re-written in an attempt to clarify them and to respond to comments on the Draft EIS. Standard EM-S1 has not been carried forward to the Supplemental Draft EIS. Management intent has been added to augment the direction for SBR, with standards that SBR shall be conducted according to the *Subbasin Review Guide*, which is intended to provide clear and detailed instructions comparable to the Federal Guide for Watershed Analysis.

**Comment:** In EM-G1, the wording of this statement, 'subbasin analysis could assist...' does not give any guidance to the manager. Restate the guideline so that it provides useful management guidelines. (Eastside Appendix 3-2; page 246)

**Response:** Description and management intent of subbasin review and objectives and standards have been rewritten in the step-down section of Chapter 3 to provide useful management direction. Guideline EM-G1 was not brought forward to the Supplemental Draft EIS.

**Comment:** In EM-G3, it will not be possible to 'verify' the broad-scale assessment without crossing administrative boundaries. Restate the guideline to give proper guidance on coordination among administrative units.

**Response:** Description and management intent of subbasin review and objectives and standards have been re-written in the step-down section of Chapter 3 to emphasize the intent that subbasin review shall be conducted in a collaborative fashion. The Forest Service and BLM administrative units (national

forests and BLM districts) are directed to work collaboratively with the U.S. Fish and Wildlife Service, Environmental Protection Agency, and the National Marine Fisheries Service to provide opportunity to discuss resource conditions on Forest Service- and BLM-administered lands within the subbasin. Guideline EM-G3, which suggests that the agencies consider coordinating subbasin review across Forest Service or BLM administrative boundaries, was not brought forward to the Supplemental Draft EIS.

## Ecosystem Analysis at the Watershed Scale (EAWS)

**Comment:** Public comments diverge on whether EAWS is needed to provide the ecological context for land management.

**Narrative:** *Some question whether EAWS is necessary. Because analyses are tiered from basin to subbasin to watershed, some respondents have doubts about the analyses' applicability and anticipate delays in their completion. They fear the process will become a bureaucratic bottleneck and assert that the purpose and need of the Draft EISs, whether restoring ecosystem function or providing goods and services, will be held hostage to another planning process.*

*It is felt that the EAWS process currently lacks adequate guidance and ecological standards for goals, objectives, standards, procedures, or analytical processes. They cite "empirical evidence" that EAWS will not adequately protect aquatic systems and note that in many cases National Environmental Policy Act and National Forest Management Act requirements are far more ecologically relevant and specific than what is required under the proposed EAWS guidance. Noting the four years of experience that some areas have had in conducting EAWS under the Northwest Forest Plan, they feel that the Forest Service has been unable to demonstrate that EAWS has consistently been effective in preventing or reducing damage to aquatic resources.*

*Others argue that EAWS is needed to estimate environmental impacts. They feel that more site-specific data on existing environmental conditions are needed to determine which management activities are appropriate for a given piece of land. If any activities are deemed appropriate, many feel EAWS is needed to fully estimate environmental consequences, especially when trying to estimate impacts from prescribed burning, weed invasion, sedimentation and stream channel morphology impacts in rare fish habitats, human safety and health concerns, and the possible loss of native plant species.*



**Response:** EAWS is a tool. The step-down section of Chapter 3 has been rewritten to more clearly state the intended use of Ecosystem Analysis at the Watershed Scale. Two alternative management strategies were analyzed to let the decision-makers weigh the advantages and disadvantages of different levels of EAWS requirements.

EAWS is an issue-driven process that is valuable in understanding the conditions and risks to resources. It is intended to help balance short-and long-term risks through the proper placement and timing of management actions within a watershed. While the intent of the EAWS objective is to use watershed-scale information to manage risks associated with threatened, endangered, and proposed species and those species with habitat that has declined significantly from its historical extent, the expectation is that EAWS will be used to meet the broad-scale objectives in this EIS.

**Comment:** Public comments diverge on when EAWS should be completed. Some feel that it should be completed prior to signing the ROD, while others feel that whenever it is completed it shouldn't delay management activities. Once completed, opinions diverge on how the analysis findings should be applied to management decisions and how priorities should be set.

**Narrative:** Many believe that the findings of EAWS will be difficult to quantify. Some feel that EAWS should have been completed as part of the scientific assessment for the Draft EISs rather than being postponed until after the Record of Decision, so that the effects of the alternatives could be stated more clearly. Many fear that no management activities will be possible until EAWS are completed, while others want projects to be able to proceed during and prior to any watershed analysis.

Some respondents are concerned that to proceed with management actions before analysis is completed may preclude opportunities to meet other Project objectives. They feel that without explicit guidance for prioritizing EAWS, analyses could be deliberately delayed until management actions are completed in some areas, contravening the intent and precluding achievement of the purpose and need. One state agency feels that the requirements preventing management prior to EAWS are too restrictive and should be modified to a more common sense prioritization that delays action in sensitive areas while aggressively managing other areas.

**Response:** Many national forests and BLM districts are currently conducting watershed analyses. Those and other EAWS will be completed before the

decision for this EIS is signed. The purpose of watershed analysis (EAWS) is to identify and describe ecological processes of greatest concern, establish how these processes are functioning, and determine the conditions under which management actions should take place. The results of EAWS will establish the context for subsequent decision making processes, including planning, project development and regulatory compliance. It is not the intent of the EAWS requirement to prohibit resource management activities prior to EAWS completion.

**Comment:** The EIS should provide clear direction for conducting EAWS and assurances of their consistent and predictable application on the ground.

**Narrative:** Some respondents point out the Draft EISs reveal little about how Ecosystem Analysis at the Watershed Scale (EAWS) will be conducted after the Record of Decision is issued. They feel that the Draft EISs do not provide adequate direction to assure consistent, predictable application of analyses findings as a foundation for management decision. They believe that resource concerns should drive the scope of EAWS, and that subsequent results of EAWS should drive the management prescriptions on-the-ground, rather than projects or funding priorities driving those prescriptions. They recommend a clear, precise process of multi-scale ecosystem analysis that accounts for both aquatic and terrestrial conditions; the process should be multi-disciplinary and involve input and consensus from a variety of sources. Respondents further note that the assumption that EAWS will reduce short-term risk and uncertainty of outcomes is valid only if EAWS information is used in a manner that promotes conservation of watershed, aquatic, and riparian resources and reduces risk; "EAWS is a tool for assessment, it alone does not reduce risk to species," they note. They feel that this should be accounted for in analysis of the alternatives.

One state agency believes that the federal agencies should not need to complete as much EAWS in the short-term as is called for in the Draft EISs standards; with available employees and funding, four years is too short a window to complete EAWS. For this respondent, the importance placed on EAWS and aquatics-dominated standards, objectives, and guidelines puts too much management direction in the hands of aquatic scientists.

**Response:** The Step-Down Section of Chapter 3 has been rewritten to more clearly state the intended use of ecosystem analysis at the watershed scale. The purpose of EAWS is to identify and describe ecological processes of greatest concern, establish how these processes are functioning, and determine the conditions under which management actions should take place. It is an analytical, interdisciplinary, issue-



driven process that provides information concerning resource conditions, risks, and opportunities in a systematic way, thereby enhancing the agencies' ability to estimate effects of management actions. The results of EAWS will establish the context for subsequent decision making processes, including planning, project development and regulatory compliance.

New objectives and standards have been provided to guide managers in conducting and following up on EAWS. The *Federal Guide for Watershed Analysis*, which is required to be followed, provides detailed guidance for conducting EAWS. New ICBEMP monitoring and evaluation objectives and standards are provided to ensure that ICBEMP goals and objectives related to EAWS are followed, and to assure consistent and predictable application of EAWS.

There is no longer a four-year window to conduct EAWS. The location and timing of EAWS in priority-to-restore subbasins is now to be determined through Subbasin Review (Alternative S2) or other appropriate step-down processes (Alternative S3).

**Comment:** EAWS should consider all lands, regardless of ownership, in a watershed or in groups of watersheds.

**Narrative:** *Although some people appreciate that EAWS requires the use of hydrologic units, they feel this methodology may not be a perfect tool and that ecosystem analysis must encompass issues on both broader and finer scales. They argue that adjoining watersheds aren't necessarily ecologically isolated, and that management in one can affect the other. Because resources such as plants and animals or even roads cross these boundaries, respondents are concerned that any analysis must consider different management activities, such as prescribed burning, grazing allotment, and transportation plans. Ecological variations within any given watershed, others argue, must be closely examined in any analysis. For these respondents, this ecological variability can include conflicting management strategies for private lands or other public lands. Some feel that EAWS is needed for all areas, while others recommend a screening process to identify any possible areas that might be exempt.*

**Response:** In order for a team to assess watershed condition, an analysis of the current and historical uses of a watershed needs to be done. Involvement of other resource users, including landowners, and other government entities is critical in identifying opportunities for cooperation in activities and identifying information useful in analysis. Although EAWS is not a decision-making process, it does contribute to

meeting land management and regulatory requirements. Where it is possible, attainment of complete data coverage of an analysis area (including other ownership) provides a better description of the conditions in the watershed and a higher level of confidence in recommendations derived from such analysis. Otherwise, data may need to be extrapolated from representative areas or layers to fill in data gaps. Exemptions from EAWS are provided for in Chapter 3.

**Comment:** The screening process described in EM-S11, to determine which land management activities are exempt from EAWS, needs to be defined prior to signing the ROD.

**Narrative:** *Some respondents are concerned that the agencies cannot establish a standard for, and the public cannot reasonably evaluate, a screening process that hasn't yet been developed by an unidentified intergovernmental team. Others suggest that the EIS either describe the screening process in detail or not allow any exemptions. They suggest strong consideration be given to incorporating, at a minimum, standards or goals pertaining to "no net loss" or "no further deterioration" of the environmental baseline for biophysical resources in those areas in the alternatives excepted from the requirement for EAWS. They further suggest that the EIS spell out the categories of activities that are exempt, as well as the process for making future exceptions to the EAWS requirements. Some respondents recommend that an interagency team be assembled and the process be conducted as soon as possible.*

**Response:** The process for determining when Ecosystem Analysis at the Watershed Scale and Subbasin Review need to occur has been better defined in the Step Down section of Chapter 3 of the Supplemental Draft EIS. Standard EM-S11 has been rewritten to require review and approval by the Regional Executives for any exemptions to the EAWS requirement.

**Comment:** RM-S4 is not implementable and should be deleted. Most subwatersheds are not large enough for transportation planning in isolation from surrounding federal lands.

**Response:** This standard is now incorporated into the road management direction in the base-level section which requires each administrative unit to develop or revise Access and Travel Management Plans to address risks identified in roads analysis. Long-term transportation needs also need to be developed or revised within 10 years after the Record of Decision is signed.



**Comment:** The EIS should clearly describe the methods and processes that will be used in interpreting and implementing the Federal Guide for Watershed Analysis and Forest Service/BLM policy implementation guides as described in standard EM-S5.

**Narrative:** *There is concern that the Federal Guide for Watershed Analysis has been variously interpreted and implemented. The EIS should more clearly define the scope, scale, goals, and process for its use.*

*One group feels that any changes to EAWS methodologies (either the EAWS or implementation guides) should be developed through an interagency, intergovernmental process. They feel it is appropriate to require watershed analysis prior to allowing changes in standards and guidelines, particularly Riparian Conservation Area (RCA) boundary changes and Riparian Management Objective (RMO) changes. However, they note that one of the shortcomings with this approach is that the current version of the Federal Guide for Watershed Analysis is inadequate by itself to analyze the effects of modifying RCAs. They feel that a document similar to the "riparian reserve module" would be needed for the project area if changes in the boundaries and management within RCA are allowed.*

*Some are concerned that there is no step in the Federal Guide for developing RMOs, yet the Draft EISs give national forests, BLM districts, and line officers total discretion regarding RMOs as established by EAWS. They feel this will not result in consistent or coordinated protection of fish and other aquatic resources.*

**Response:** A description and management intent of analysis at the watershed scale has been added to step-down direction (Chapter 3) to clarify its scope, scale, and goals. The *Federal Guide for Watershed Analysis* and the process for EAWS were developed several years ago. It is not the intent of the EIS to change this established process, which is described in the *Federal Guide*.

The process for delineation of Riparian Conservation Areas (RCAs) is explained in the Aquatic/Riparian/Hydrologic Component section of base level direction. Prior to completion of either EAWS or programmatic planning processes, including land use plan revisions, RCA widths shall follow interim criteria described in this section for Alternatives S2 and S3. During EAWS or through appropriate programmatic planning processes this interim criteria shall be replaced with ecologically appropriate criteria consistent with the attainment of objectives. Rationale for RCA delineation shall be documented through appropriate NEPA decision-making process and documentation.

**Comment:** Opinions diverge on whether requirements for EAWS should be expanded in standards EM-S8 and EM-S12, or whether the "triggers" for analysis are too restrictive.

**Narrative:** *Suggestions were made to expand or clarify the requirement for triggering EAWS. Some respondents feel that requirements under Alternative 6 are more protective of candidate and sensitive fish species and should be incorporated into the selected alternative. They suggest that standard EM-S8 should clarify the difference between proposed or designated "critical" habitat and habitat that is used by the species.*

*These respondents recommend that the presence of listed species or critical habitat should be among the criteria for prioritizing subbasin reviews and EAWS. They suggest that subbasin reviews should include evaluation of the status and distribution of species in a given area, and set priorities for EAWS where there is an identified risk of conflict between management actions and species recovery. The description of standard EM-S12 for Alternative 6 also should be applied to the selected alternative so that all areas may benefit from the analysis process set forth in the EIS. Additional triggers should be added, including catastrophic land-altering events, such as fires and floods.*

*One concern is that the triggers for watershed analysis are tied to the initiation of individual management projects or actions, not necessarily to restoration priorities or programs. They feel the triggers for watershed analysis should be driven by the restoration priorities identified through the completion of analytical process (for example, subbasin review, road risk inventory, water quality management plans), not based on where prior or future planned projects would occur. One recommendation was to edit standard EM-S12 to require watershed analysis in all categories of subbasins (not just Category 1).*

*One group felt that the EAWS "trigger" related to federally listed species is too restrictive; with recent and expected listing of several fish species, most of the basin will meet this "trigger." They would like to see a new, less restrictive scheduling standard that will not shut down management while EAWS is taking place.*

**Response:** The standards requiring Ecosystem Analysis at the Watershed Scale have been simplified and clarified in response to comments. In Alternative S2, EAWS is required prior to planning and designing management activities where they have the potential to negatively affect threatened, endangered, or proposed aquatic species or their habitats, or their source habitats within terrestrial watersheds that have declined substantially in geographic extent from the historical period. Alternative S3 has no EAWS



“triggers” or requirements, but relies upon Subbasin Review to identify priorities and schedules for conducting necessary EAWS. (See the Step Down section of the base level management direction in Chapter 3 of the Supplemental Draft EIS).

**Comment:** Opinions differ on whether standard EM-S13, regarding changing EIS standards after EAWS, is too restrictive or not restrictive enough.

**Narrative:** *One state agency feels that EM-S13 is too restrictive because it doesn't allow changes to be made through site-specific National Environmental Policy Act analysis unless EAWS is completed first. Subbasin review and site-specific analysis should be sufficient to warrant an exception to standards with approval of the regional office or proxy. They would like to see an objective that states that alterations to standards after EAWS can occur under more than just rare circumstances, but that in the spirit of adaptive management “after EAWS” should not be interpreted so literally.*

*Another commenter feels that standard EM-S13 should be deleted. To this person, the standard overreaches the intent of the broad-scale direction of the project, because Riparian Management Objectives (RMOs) and Riparian Conservation Areas (RCAs) are site-specific and should be adjusted according to site-specific information. While others state that it is appropriate to require watershed analysis prior to allowing changes in standards and guidelines, particularly RCA boundary changes and RMO changes, some believe that the level of detail expected from an EAWS to accomplish this site-specific standard is unrealistic and would be too expensive to complete, and that changes should be made according to forest plans.*

*Other respondents suggest that the standards are rigid, uncompromising, inflexible, and difficult to modify. They feel that they do not allow the agency personnel who are most familiar with conditions in their management areas to make decisions that fit site-specific conditions without first proposing to modify or amend the EIS or land use plans. These respondents feel that the Draft EISs propose to place limits on the scope of decisions that can be made under National Environmental Policy Act by specifically disallowing modifications to RCAs and RMOs without a watershed-scale ecosystem analysis. They believe the Draft EISs also attempt to add the EAWS process to the NEPA process by requiring that an EAWS be performed in situations where a NEPA analysis is being conducted.*

*On the other hand, some commenters feel that the current standards are not strong enough and would result in unacceptable risks to aquatic resources. They also feel that additional site-specific analyses should be required in addition to watershed analysis in some instances. One commenter does not support the use of optional default standards in lieu of completing watershed analysis; this*

*person feels that the standards for watershed analysis in Alternative 3, Alternative 4, and Alternative 5 are inadequate and will result in unacceptable risks to aquatic resources, including anadromous salmonids.*

**Response:** In the Draft EISs, Standard EM-S13 for the preferred alternative provides that standards in the EIS, including riparian management objective values and riparian conservation area boundaries, can be changed only after conducting ecosystem analysis at the watershed scale. Simplifying and clarifying the direction has been done in the Supplemental Draft EIS.

The “triggers” for ecosystem analysis at the watershed scale have been simplified in Alternative S2 and eliminated from Alternative S3. As explained in the Step Down section of Chapter 3, under Alternative S2, EAWS is required prior to planning and designing management activities where they have the potential to negatively affect threatened, endangered, or proposed aquatic species or their habitats, or their source habitats within terrestrial T watersheds that have declined substantially in geographic extent from the historical period. Adjusting RCA boundaries so that they are appropriate to local conditions can be completed through similar processes.

Selecting either of the action alternatives in the Supplemental Draft EIS would establish interim riparian conservation area definition criteria. Then, as EAWS or programmatic planning processes (including land use plan revision) are conducted, the interim criteria for delineating RCAs would be replaced with criteria identified using scientific information and local knowledge and information on riparian processes and functions. The rationale for final RCA delineation criteria will be presented through appropriate NEPA decision-making processes.

**Comment:** The requirement for “no net increase in road density in subwatersheds with road densities less than 0.7 miles per square mile” described in EM-S9 should be included in the selected alternative, or revised to require EAWS for any increases in road density in roadless or low road density areas.

**Response:** The direction in the Supplemental Draft EIS no longer includes standards related to road density. For areas that are unroaded or where few roads exist, the direction in the Supplemental Draft EIS states that new roads in these areas would be rare and would first require a roads analysis to take place that weighs the relative habitat values against the need to address large-scale environmental damage. As discussed in Chapter 1 of the Supplemental Draft EIS, the Forest Service rulemaking



regarding protection of the remaining roadless areas in the National Forest System will affect future management of these lands.

**Comment:** The requirement that "EAWS shall be completed prior to activities requiring an EA/EIS and that significantly modify large blocks of existing native rangeland plant communities..." described in EM-S10 should be included in the selected alternative.

**Response:** Large blocks of existing native rangeland plant communities were key habitats in the Draft EIS because relatively unfragmented blocks of native rangeland were deemed important for terrestrial wildlife species in *An Assessment of Ecosystem Components* (Quigley and Arbelbide 1997.) These relatively unfragmented native rangeland plant communities are retained as a focus in the Supplemental Draft EIS Alternatives S2 and S3, in identified terrestrial (T) watersheds. Management direction for these T watersheds emphasizes conservation and restoration (if needed) of certain source habitats contained within.

In Alternative S2, EAWS shall be conducted in T watersheds before planning and designing resource management activities where these activities have the potential to negatively affect source habitats that have declined substantially in geographic extent from historical to current periods. This includes large blocks of existing native rangeland plant communities (*see also, Ecosystem Analysis at the Watershed Scale [EAWS]*).

**Comment:** Standard EM-S4, to use information from Subbasin Reviews in subsequent ecosystem analysis and land use plan revisions, is too vague.

**Narrative:** *Some respondents feel that standard EM-S4 is too vague to be measurable, trackable, or meaningful, because they see no way to determine if subbasin review information was used to provide context or not. They feel this standard is more of an objective that they would like to see required. They say that EAWS would most benefit watersheds that are in need of restoration, presumably Category 2 and 3 subbasins, and that the use of watershed analysis as a protective measure leads to a confusion about where to locate watershed analysis. They feel that the scale of subbasin categorization also leads to inappropriate prioritization; although some subbasins will need restoration more than others because of the range of conditions, they feel that distinctions cannot be made at the subbasin scale. Therefore, these respondents feel, watershed categorization should not be used to vary management direction.*

**Response:** All standards that were brought forward from the Draft EIS to the Supplemental Draft EIS have been revised and rewritten to improve clarity and understanding. The intent of EM-S4 was to provide context for finer scale decision to be made at the local level. The Step-down Section of Chapter 3 of the Supplemental Draft EIS contains a similar objective which more clearly defines the appropriate use of information obtained through Subbasin Review.

**Comment:** Standard EM-S6, requiring Line Officers to set the scope of Ecosystem Analysis, is inadequate.

**Narrative:** *Some respondents feel that standard EM-S6 should be deleted and replaced with clear standards by which the scope of analysis will be determined. Still others recommend that certain elements or issues be addressed in all EAWS; they feel that the list of minimum requirements should include: aquatic and watershed restoration needs, terrestrial restoration needs, and forest and/or rangeland restoration needs.*

**Response:** The process for determining when Ecosystem Analysis at the Watershed Scale and Subbasin Review need to occur has been better defined in the Step-down Section of Chapter 3 of the Supplemental Draft EIS. Subbasin Review establishes the need and priorities for conducting EAWS; EAWS, in turn, provides context for management through description and understanding of specific ecosystem conditions, capabilities, risks, and opportunities.

**Comment:** The EIS should ensure funding for Ecosystem Analysis at the Watershed Scale (EAWS).

**Response:** If EAWS is required by the Record of Decision, then the costs of the process will be included in the project funding. The Congress has the final approval of funding levels through the normal appropriations processes. Ecosystem Analysis at the Watershed Scale is not intended to be a costly process, and field experience has shown that the process helps the agencies become more efficient and effective in their project planning, project implementation, and decision making.

**Comment:** The selected alternative should not require Ecosystem Analysis at the Watershed Scale for management activities in special species habitat.

**Narrative:** *Some people question why EAWS are required for management actions when there is already normal NEPA planning. Stating that all projects in some areas*



*would be subject to this analysis, they believe it is a waste of time and money since ESA consultation would be required anyway.*

**Response:** EAWS is intended to supplement information in the NEPA process. It often covers a larger area and therefore provides context for, and helps to prioritize, subsequent projects. ESA consultation is an important piece that feeds into EAWS, with the intent of streamlining consultation on individual projects within that watershed.

## Scale/Decisions

### Scale

**Comment:** Data used to characterize the project area do not fit all the local areas.

**Narrative:** *Some question the methodologies and data used to study ecosystems in the project area. They note that to say that portions of land are in poor ecological condition, should not be construed to mean that the whole landscape is unhealthy. They feel that classifications using this aggregated data give a poor picture of the existing ecological condition of the basin, do not portray site-specific risks, and can mask good ecological health. One respondent finds limitations in resolution when the data sets are applied spatially to finer scales of management; the scientific foundation for the Draft EISs is felt to be inadequate because of flaws in the data for fine-scale analysis.*

*People question how cumulative effects can be predicted from alternatives when ecosystem classification data varies in its scale and resolution, or when only isolated subsample data were used to characterize the entire project area.*

**Response:** Information on conditions was not meant to imply that the whole landscape is unhealthy, but only that at the broad-scale certain trends can be detected. The Supplemental Draft EIS includes additional information as well as maps of places where specific landscapes, habitats, and watersheds are in need of restoration, and other areas that are healthy and should be maintained.

One objective of Ecosystem Analysis at the Watershed Scale and Subbasin Review is to verify the broad-scale information in various specific places to provide the basis for adjusting management as needed at the local level. Through these processes final delineation of such designations as Riparian Conservation Areas,

aquatic A1 and A2 subwatersheds, and terrestrial T watersheds will be made by local land managers from mid- and fine-scale data and knowledge.

Objectives and standards have been revised to more appropriately reflect the broad scale of the scientific data and the goals of the project, along with a process for local managers to apply the remaining broad-scale objectives and standards to the local level.

**Comment:** Comments diverge on whether broad-scale direction is necessary:

- ♦ Some feel the EISs are currently too broad-scale and should be more fine-scale and specific;
- ♦ Others feel the EISs are too narrow and should be more broad-scale;
- ♦ Some feel some parts of the direction should be broad-scale but some parts should not.

**Narrative:** *Some comments state that the standards and objectives are too general to assure attainment. They raise concern about the interpretation of objectives and standards during implementation, some feeling that the standards and objectives do not provide measurable goals and time lines. These respondents suggest that broad-scale standards be eliminated and a set of objectives be developed that is not so broad-scale. Many want stronger and more enforceable standards.*

*Others believe the broad-scale approach does not adequately recognize the on-the-ground knowledge and expertise of local land managers. They feel the size of the project area makes the preferred alternative unresponsive to local concerns and prescribes inadequate collaboration with other agencies and affected parties. They feel planning and management should not be controlled by a top-down approach, but rather directed on a case-by-case basis by local people who are familiar with the land. Many view the motive for using the broad approach not as sound ecological management, but rather as a matter of social and political control.*

*Many people feel that broad-scale direction in the Draft EISs cannot analyze and manage an area as vast, complex, and diverse as the project area. Many believe that only direction for fine-scale areas such as administrative units, watersheds, or landscapes will lead to effective management. Some feel that the Draft EIS, if implemented as written, will cause additional ecosystem degradation because of conflicting directions and management standards.*

**Response:** The Supplemental Draft EIS took a different approach than the Draft EISs to better define



the specific issues needing to be addressed at the broad-scale by outlining a process for taking the broad-scale terrestrial, aquatic, landscape, social, and economic direction and "stepping it down" so that the local land manager has the ability and flexibility to use local knowledge and information to make local decisions. This approach recognizes that an array of landscapes and resources exist across the project area, while giving guidance and direction to provide for consistency and accountability (*see also Decisions*).

**Comment:** Most of southeastern Oregon and southern Idaho have more in common with the Intermountain Basin than they do with the interior Columbia River Basin. If we are developing a broad-scale EIS, then it would make more sense to include these areas in an EIS on the Intermountain Basin.

**Response:** An ecosystem can be defined by many criteria. The geographic boundary of the Interior Columbia Basin Ecosystem Management Project was identified through a combination of factors, including the need for a logical, identifiable boundary and for achieving efficiency in administration. The interior Columbia River Basin east of the federally administered lands already being addressed in the Northwest Forest Plan was chosen as being logical and identifiable. Those portions of the Great Basin and Klamath Basin within Oregon were added for efficiency in administration, since all of the Forest Service- and BLM-administered lands in the state of Oregon are overseen from one Forest Service Regional Office and one BLM State Office. Land in southern Idaho is drained by the Snake River. Issues in that drainage area are a significant part of the issues being addressed in this EIS.

**Comment:** The EIS should clearly identify appropriate uses of cluster designations and further delineate circumstances where finer-scale information is needed.

**Narrative:** The cluster designations were seen by some respondents as being a poor tool for making management decisions, because the range and forest clusters were defined at such a broad scale. There is concern about the scale of the spatial data used in developing the alternatives, and about how the vital components of ecosystem function and viability can be viewed and managed at this scale. This respondent feels there must be clear and specific mechanisms in place to further delineate ecosystem needs at finer scales. Some feel that forest and range clusters are artificial groupings which have more diversity than implied in the plan.

**Response:** The concept of range and forest clusters was used for description and analysis in the *Integrated Scientific Assessment* (Quigley, Haynes, and Graham 1996) and the Draft EISs but was not brought forward to the Supplemental Draft EIS, partially in response to public comments. The project area has been organized sub-regionally according to existing Resource Advisory Council and Provincial Advisory Committee (RAC/PAC) areas in the Supplemental Draft EIS to be more useful for implementation purposes. Direction in Alternatives S2 and S3 is divided into the *step-down* process which explains how finer-scale information is documented; *base level* management direction - an integrated approach to accomplishing an acceptable level of risk to resources across the planning area; *restoration direction* - an integrated approach to restoring ecosystems at risk; and direction specifically for *aquatic A1 and A2 subwatersheds* and *terrestrial T watersheds*. (See Chapter 3 for an explanation of each category of direction.)

## Decisions

**Comments:** Comments diverge on whether local people and regional/subregional Forest Service and BLM managers should make resource and management decisions, including decisions regarding riparian health.

**Narrative:** Some commenters believe the project promotes a "top-down" management philosophy that does not, in their view, adequately consider economic or social consequences. They perceive the project as an unnecessary move towards centralized control. These individuals would like to see local authorities have control over site-specific management. They say that working and living with the natural resources promotes scientific knowledge and common sense lacked by those sitting far away at a desk. One individual would like to see language included in the preferred alternative to include permittees in the decision-making process. Other respondents feel that local land managers, with more local knowledge and the ability to respond quickly to conditions, should have more control over the specific guidelines regarding aquatic health such as buffer zones, vegetation management, canopy, debris, and temperature.

**Response:** The direction in the Supplemental Draft EIS provides a broad context in which fine-scale decisions made at the local level are able to support the needs of large-scale issues (such as anadromous fisheries) that could be affected by local actions. This will allow a consistent and coordinated approach to the local decisions by establishing parameters and providing scientific information. The Supplemental



Draft EIS contains a "step-down process" which enables local decision-makers to apply this broad-scale scientific information and management direction to local conditions.

**Comment:** Policy decisions for an EIS of this nature should be made by citizens and states, not by Forest Service or BLM employees.

**Response:** The Federal Advisory Committee Act (FACA) requires that decisions on the expenditures of federal money, policies, programs, plans, and projects (this includes decisions for lands administered by the federal government) in general must be made by federal officials, with citizen input and participation and in compliance with applicable state laws and regulations. Consensus-type decisions may be made with an officially chartered "Federal Advisory Committee." A "Federal Advisory Committee" is a collaborative group of individuals, including both federal and non-federal members selected by a federal agency or official and approved by the Department Secretary to give advice to federal officials, such as the Department of Interior's Resource Advisory Councils. The intent of this is to ensure that policy decisions are made in a professional, unbiased manner for the benefit of the American public, without undue influence from any particular interests or individuals.

**Comment:** An informed selection of a preferred alternative cannot be made until a Supplemental Draft EIS is prepared and circulated for public discussion.

**Response:** The project was directed in October 1998 by the Secretaries of Agriculture and Interior to prepare a Supplemental Draft EIS that will be available for a 90-day public review and comment period.

**Comment:** The legal justification for including standards in this programmatic EIS should be clarified.

**Narrative:** Questions are raised about whether a programmatic EIS should set standards that will directly cause environmental changes and determine levels of goods and services without site-specific National Environmental Policy Act analysis. One respondent, citing an apparent lack of case law in support of providing standards for management under programmatic decisions, asks that the EIS explain the legal justification for this kind of action.

**Response:** The Council on Environmental Quality regulations on implementing the National Environmental Policy Act of 1969, describe the categories into which federal actions tend to fall (40 CFR 1508.18). These categories include "Adoption of formal plans...which guide or prescribe alternative uses of federal resources, upon which future agency actions will be based." The Interior Columbia Basin Ecosystem Management Project falls into this category. Standards for broad-scale direction are analyzed at the broad-scale. The outputs of livestock forage and timber harvest resulting from each alternative analyzed, for example, are estimated at the basin or Resource Advisory Council/Provincial Advisory Committee level. The step-down direction in Chapter 3 explains how the broad-scale direction would be applied at the local level, including site-specific NEPA documentation of the levels of goods and services resulting from local implementation actions.

**Comment:** The EIS needs to better define the authority of the 'responsible official' to select or modify an alternative.

**Narrative:** One individual's response indicates confusion about the "freedom afforded the Regional Foresters/State Directors to select one of the alternatives or to modify an alternative." This respondent feels that such flexibility makes it difficult for the public to analyze the eventual ramifications of the Draft EIS, and believes that the EIS should address whether the selected alternative must apply to every forest in a region and to all Forest Service- and BLM-administered lands in a state, or whether the flexibility also pertains at a smaller unit of area.

**Response:** If, in reviewing environmental effects of alternatives and public comment on the Draft EIS and Supplemental Draft EIS, the responsible officials (Forest Service regional foresters and BLM state directors) determine that the decision should be a modified form of one of the alternatives already considered and reviewed by the public, then a determination would be made whether the modification constituted a "substantial" change. If it did, then the EIS would be supplemented and subjected to further public review and comment. The Council on Environmental Quality's (CEQ) regulations (40 CFR 1503.4) say that agencies preparing an EIS shall assess and consider comments and state the response in the document. One possible response is to modify alternatives, including the proposed action. The same regulations (40 CFR 1502.9) require that federal agencies prepare supplements to draft or final environmental impact statements if they make substantial



changes in the proposed action that are relevant to environmental concerns.

Chapter 1 of the Supplemental Draft EIS explains that the management direction does apply to all identified Forest Service- and BLM-administered lands within the project area. All of the Forest Service and Bureau of Land Management administrative units (forests and districts) to which the decision applies are identified in the Purpose and Need section of the Supplemental Draft EIS.

## Public Trust and Federal Authority

**Comment:** The project appears to some people to be taking control of lands in the Northwest, as a vehicle of either the federal government or the United Nations.

**Narrative:** *Numerous respondents say that not only does the project bypass all legal mechanisms for land management and planning, but they feel it is a massive federal takeover that threatens to depopulate the Northwest, lock up public lands, and steal state and local power in favor of federal or even international control. In comments ranging from suspicious to hostile to furious, many call the project a back-door land grab and a conspiracy, or they equate the project with socialism, communism, or dictatorship. These respondents feel that Congress has neither mandated this EIS, nor authorized ecosystem management as a driving principle for planning. Many reject the notion of public collaboration in the plan, stating that federal officials decided the outcomes of the planning process long ago.*

*International organizations such as the United Nations appear in the comments of a few respondents, who claim that the project is a manifestation of such pan-national edicts as the United Nations Biodiversity Treaty, the Man and the Biosphere Program and "Agenda 21." Some feel that these items are threats to American sovereignty, proposing to return much of North America to a state of wilderness. Within the United States, some who fear a loss of national sovereignty accuse the President's Council on Sustainable Development and various non-governmental organizations of collaborating with international interests to the detriment of American citizens.*

**Response:** The agencies recognize the existence of mistrust or disapproval of government agencies and employees among some individuals, groups, or organizations. We have emphasized an atmosphere of open and frequent communication with the public

throughout the process to help people learn about and participate in the development of the alternatives and the management direction. There is no connection between this project and any international or other organization. (*See also Ecosystem Management*).

**Comment:** The Draft EISs do not adequately address impacts on private existing timber rights, grazing rights, access rights, and mining claims on affected public lands, and do not address corresponding legal and financial recourse the public may have when such impacts are incurred.

**Response:** Because of the broad scale nature of the EIS, the potential effects of ongoing and foreseeable activities on non-federal lands was considered as a part of the cumulative effects analysis conducted by the Science Team. Legal and financial recourse for potential impacts, both positive and negative, is beyond the scope of this EIS.

**Comment:** The EIS will infringe on states' rights concerning water rights, control over navigable streams, and management of fish and wildlife populations.

**Narrative:** *Most people addressing water rights strongly believe in the use of water as a personal right governed by the states, not the federal government. Some say that states' rights could be compromised because of the assertion of federal control over water rights and/or the assertion of control over the beds of navigable streams as a result of adopting ecosystem management. They are concerned that their rights may be compromised by the EIS, and they demand to know how the federal government intends to manage waters for irrigation and other uses. They feel that ecosystem management cannot succeed without simultaneous management of wildlife and fish populations, thereby infringing upon the rights of the states which are charged with management of these populations.*

**Response:** The Record of Decision would make no management decisions that would impose regulations on state, local, tribal, or private lands that affect rights, privileges, regulations, policies, or provisions that are the responsibility of state or local agencies or private landowners. Water rights are under state authority and are established through water rights adjudications. The direction outlined in the Supplemental Draft EIS would apply only to lands administered by the Forest Service and BLM and would be consistent with all federal statutes and, to the maximum extent possible consistent with federal law, state and local statutes.



Federal agencies exercise rights to divert water pursuant to state water laws, and participate as do private parties through state water permitting processes. Federal agencies also participate in state-generated water right adjudication processes when those adjudications are McCarren Act adjudications. The Forest Service and BLM are involved in two adjudications in the project area, the Snake River Adjudication and Klamath Basin Adjudication, both of which are administered by agencies separate from the project.

The right to use water is granted by the states through each state's water laws. If water is diverted on Forest Service- or BLM-administered lands, the Forest Service or BLM have authority to regulate uses of these lands, and the agencies are required to issue special use permits, easements, or equivalent permits. These permits must be consistent with land use plans.

Management direction focuses on habitat for fish and wildlife and does not directly address populations, which are managed by the states.

**Comment:** All federal land holdings should be turned over to the states.

**Narrative:** *Many respondents, angry at the federal government for perceived mismanagement, demand that all federal holdings be returned to the states. These respondents believe that it is a constitutional right for states to control lands within their boundaries, and that the Forest Service and BLM are circumventing Congress and the people by imposing federal laws and regulations.*

**Response:** The lands administered by the Forest Service and BLM were established through federal law (such as the Organic Act of 1892 and Weeks Act of 1911) in accordance with congressional direction to set aside lands for the public to ensure long-term protection and management of the resources (such as water, timber, fire protection). Whether these lands should be divested from federal management and returned to the states is more appropriately addressed at the executive and congressional level.

**Comment:** The project should continue its public collaboration process.

**Narrative:** *A few commend the project for their collaboration process and for viewing the region as an ecosystem in need of restoration and attempting to restore ecosystems.*

**Response:** The project charter outlined that the project be conducted using an "open public process." Interacting with the public across such a broad area

has been challenging at times; however, every effort has been made through public meetings and various communication tools to keep members of the public, interested stakeholders, and organizations informed and involved throughout the process.

## Global Climate

**Comment:** The EIS should consider the consequences of global climate change.

**Narrative:** *Some respondents say that the EISs and science documents do not adequately address global warming. Some, citing the perceived gravity of the issue, state that such an omission is a major flaw. Noting the project's advocacy of prescribed burning as a management tool, some wonder if planners considered global climate when writing the Draft EISs. Some predict cataclysmic effects that might take place if human activities "do not change for the better." A few claim the best way to combat global warming is to harvest and use timber, thus preventing its carbon from re-entering the atmosphere as part of greenhouse gases. Others claim that no such global warming trend exists and that human activity has not caused any change in global climate; therefore, the EIS should drop all mention of global warming.*

**Response:** Global warming, or climate change is currently being debated within the scientific community. Climate has always changed over time, resulting in continuing adjustments by aquatic and terrestrial ecosystems. Vegetation is especially sensitive to climate change. Healthy ecosystems are better able to withstand environmental stresses and disturbances; therefore, management that promotes healthy ecosystems inherently provides some protection from global climate change. Ecosystems with high volumes of accumulated fuels, and those with vegetation types and structures described in the EIS, are at much greater risk from uncharacteristic wildfire; fuel reduction, whether by the use of prescribed fire or mechanical or manual thinning can gradually reduce that risk across landscapes. It unknown how much human activities have contributed to the documented warming of the climate in the Pacific Northwest and globally. However, it is well known that climate strongly influences ecological processes such as biological productivity, fire regime, soils, streamflow, erosion, and human uses of the land and resources. For these reasons, global climate change and its implications are appropriate topics of consideration for the ICBEMP. The *Scientific Assessment* addresses climate and climate change in Jensen et al. (1997) and Hann, Jones, Karl, et al. (1997); the Supplemental Draft EIS includes a discussion of climate and climate change in Chapter 2.



## Use of Science

**Comment:** Decisions in the EIS should be based on science and objective analysis, not on political or personal biases. The EIS should be more consistent with the findings of the Science Integration Team.

**Narrative:** *Many assert that the Draft EISs are politically driven, and they claim that the preferred alternative ignores the advice of the agencies' own scientists. They believe the scientific findings of poor resource health (for example regarding salmon or other fish, the minimum amount of old growth, detrimental effects of roads, soil productivity, unnatural buildup of fuels, or poor range condition) are impartial. They criticize don't feel the EIS Team is impartial and believe they have influenced the structure of the alternatives and selection of the preferred alternative. Some think the EIS should address a continually changing world and population, and not set standards that cannot change with the decades to come. A few feel the agency is collecting the best data possible and commend the science used by the team. Another view is that the project should be terminated and the science forwarded to the local Forest Service/BLM administrative units for their consideration and use when revising their land use plans.*

**Response:** The Science Integration Team did the Evaluation of Alternatives in the Draft EIS and the Science Advisory Group conducted the Analysis of Effects for the Supplemental Draft EIS to reflect the cumulative effects analysis required by NEPA. They were able to bring forward, through that process, areas of inconsistency with the science findings. In addition, a Science Consistency Report was developed to identify where management direction in the Draft EIS preferred alternative was inconsistent with the *Assessment of Ecosystem Components*. The EIS Team and the Executive Steering Committee reviewed this report and made necessary adjustments to the Supplemental Draft EIS to address potential inconsistencies.

**Comment:** The validity and credibility of science used in the project should be peer-reviewed by non-agency scientists.

**Narrative:** *A few criticize scientific methodology, citing faulty assumptions and a lack of detailed analysis. They doubt the credibility of the science collected, claiming that the Science Integration Team (SIT) used old data and did not do any field work of their own. Others wonder why the SIT didn't collect available data from local communities that had recent findings. Many assert that the science that was collected should be sent through a peer review, but not by Forest Service or BLM scientists. They believe the science would have more credibility if it had been collected by outside agency scientists.*

**Response:** The scientific information was compiled and synthesized by more than 300 scientists and technical specialists. Individuals were affiliated with federal agencies, state agencies, universities, tribal governments, and private contractors. The scientific information was brought forward through task groups, scientific panels, workshops, field trips, literature reviews, and technical reviews.

The scientific reports were peer reviewed with oversight from an independent peer review board to assure credibility of the scientific analysis and findings. The Science Integration Team was not informed of who the reviewers were and the reviewers were not informed of who the authors were; this is called a double-blind peer review. Internal and external groups were allowed to provide names of potential peer reviewers to the review board for consideration.

## EIS Alternatives

### Range of Alternatives

**Comment:** The Draft EISs did not consider a wide enough range of alternatives.

**Narrative:** *Some respondents feel that although a broad range of conservation and restoration strategies are analyzed, little consideration is given to increasing the amount of timber, grazing, and motorized recreation. One person notes that only one cluster in one alternative was designed for high intensity commodity management.*

*Some respondents feel that the range of alternatives is inadequate because all action alternatives effectively adopt the same standards. One respondent felt that a range of riparian management alternatives was not considered. Another wants to see an expanded range of alternatives that encompasses more accelerated and flexible vegetative treatment strategies. For the EIS to represent a broad range of alternatives, some organizations want their own alternative to be considered in detail.*

*According to some, none of the Draft EIS alternatives frame the major choices facing the region, reflect credible science, or respond to public input. The respondents believe that the action alternatives do not offer effective, implementable strategies for dealing with major management issues. To these commenters, none of the alternatives protect key resources and values or address ecosystem restoration in a sound fashion. All alternatives are felt either to be "non-adoptable" or to have too much discretion to offer meaningful choices for the region.*



*Some respondents feel that no alternative represents an integrated approach that recognizes the need for both active restoration and reserves, because Alternative 4 calls for "aggressive" silvicultural management across the landscape – even in roadless areas and other areas with high ecological integrity, which they feel could be degraded by such management.*

*One respondent asks that the EIS specify those alternative management methods that were eliminated from detailed consideration.*

**Response:** Seven different management alternatives were presented in the Draft EISs. An additional three alternatives are presented in the Supplemental Draft EIS. The three "no-action" alternatives, and seven "action" alternatives were developed from scoping across the basin and public comments received on the Draft EIS.

Each alternative presents a different strategy to address the issues raised during scoping and the public comment period. Each alternative describes a different level of commodity outputs and protection. All 10 alternatives (including those presented in the Draft EIS) are available for selection by the deciding officials.

The National Environmental Policy Act requires the agency to explore and evaluate "all reasonable alternatives" which respond to the "underlying purpose and need." The alternatives presented in this Supplemental Draft EIS and the previous Draft EISs meet these requirements. To date, no complete alternatives have been submitted to the project. One partial alternative was submitted, but it was not analyzed because it was incomplete and did not respond to the purpose and need in Chapter 1. Alternatives with significantly higher levels of commodity management were not analyzed because they would not likely meet requirements in the Endangered Species Act. The action alternatives in the Supplemental Draft EIS were restructured to include both active restoration in certain identified areas (high priority restoration subbasins) that are at high risk of resource damage from natural disturbances, such as insects and disease and uncharacteristically intense wildfires, and protection of areas with high ecological integrity (A1 and A2 subwatersheds and T watersheds). Many alternatives were initially considered but were not given detailed analysis for various reasons (see Alternatives Considered but Eliminated in Chapter 3).

**Comment:** The alternatives should all be presented in a parallel fashion.

**Narrative:** *In discussing the design of alternatives, some respondents suggest parallel organizations for all alternative descriptions, including references to traditional land uses and management actions. For example, in some descriptions of alternatives, grazing is discussed but not timber harvest, roads; levels of timber harvest, or road reductions.*

**Response:** Because some of the public found it difficult to follow the projected traditional management actions (such as livestock grazing and logging) among alternatives in the Draft EISs, the Supplemental Draft EIS (Chapter 3) discusses the themes, objectives, standards, and guidelines for each alternative that directs the management of activities on BLM- and Forest Service-administered lands. All alternatives in the Supplemental Draft EIS are presented in a similar fashion.

**Comment:** **The alternatives do not provide a limit to the cumulative and direct disturbance to soils, vegetation, and other resources that could occur within watersheds and the whole project area.**

**Narrative:** *Some commenters expressed a concern that previous forest plans at least provided a limit to the cumulative and direct disturbance to soils, vegetation, and other resources that could occur within project areas and watersheds. They feel that such limits are absent in the Draft EISs, except for some aspects of Alternative 7, even though cumulative disturbance and resultant effects are at the heart of the broad-scale issue of how alternatives are likely to affect aquatic resources.*

**Response:** The EIS addresses these issues at the broad scale, while allowing local management flexibility on implementation to meet the long-term goals of the project. The direction for each of the alternatives has been developed to meet these long-term goals, but the level and intensity of management varies between the alternatives. This direction, in conjunction with local land use plans, will provide resource protection in the long term.

## Combinations of Alternatives

**Comment:** **The selected alternative should be a combination of alternatives, to include both protection of a series of reserves plus the restoration of other non-reserve areas, and/or to provide for substantial levels of forest and range restoration and social-economic needs along with resource protection.**



**Narrative:** *Many people suggested that the selected alternative should be a combination of two or more of the alternatives described and analyzed in the Draft EISs. The concerns expressed in these suggestions generally focus on the following themes: aquatic, forest, and rangeland health must be restored; we should proceed cautiously with restoration efforts; we should be more aggressive in restoration attempts; we should establish and protect a series of reserves; more needs to be done to meet the social and economic needs of people and communities.*

*Specifically, some recommend a balance between Draft EIS Alternatives 4 and 7, because they feel that while areas of high ecological integrity must be preserved as reservoirs of ecological health, more aggressive treatment of disturbed areas as recommended in Alternative 4 should also be included. Some suggest it would be prudent to continue a policy of 'hands-off' on roadless lands to ensure that most, if not all, of these lands remain roadless and unmanaged (reflected in Alternative 7).*

*Some respondents think the selected alternative should incorporate more of the experimentation, local research, and monitoring of Alternative 6 into Alternative 4 because such features appear to be essential for adaptive management to succeed. Some respondents suggest that an alternative be developed and selected that combines components of restoration (as highlighted in Alternative 4), adaptive management (Alternative 6), and site-based management prioritization.*

*Some respondents feel that combining restoration features of Alternative 4 with adaptive management features of Alternative 6, and reserve design (Alternative 7) and elimination of roads would hold the best prospects: aggressively restoring conditions to benefit wildlife, going slow where uncertainties exist, and reserving the maximum area possible in roadless condition. Some would use the Alternative 4 approach where conditions are healthy, Alternative 6 if problems exist in the watershed or subwatershed, and Alternative 7 if the situation "looks bad" until the area improves to acceptable standards. Others would use Alternative 7 for all unroaded areas, using restoration (Alternative 4) only where preservation would be inadequate to return the land to ecological integrity, with caution (Alternative 6) to be used where questions indicate a need for further study.*

*Some would combine the caution and experimentation of Alternative 6 with restrictions on management activities in certain areas (Alternative 7). Others prefer adding mitigation strategies to a combination of Alternatives 6 and 7, to avert negative socio-economic effects on isolated, non-resilient communities. Some see Alternative 6 as showing the most promise to provide a healthy mix of forest stages and composition, restore landscape health, and control noxious weeds, with establishing a system of reserves on federal lands (Alternative 7).*

*Some would prefer a combination of Alternatives 3, 4, and 5 or Alternatives 1, 2, and 5 because they feel that social and economic needs of society would be better met by an alternative that would provide substantial levels of forest and range restoration, riparian restoration, hard commodity targets, greater road densities, more grazing, and fewer wilderness and roadless areas than Alternatives 2 alone or Alternatives 6 and 7 would allow.*

**Response:** The Supplemental Draft EIS describes and analyzes additional alternatives. Alternatives S1, S2, and S3 portray different approaches to many of the concerns expressed. Alternative S1, no-action, would continue with present management unchanged; it is an "updated" version of Alternative 2 of the Draft EISs, recognizing that the interim management for protection of old forests and anadromous and other native fish habitat has become part of Forest Service and BLM land use plans.

Alternatives S2 and S3 include several aspects of the Draft EIS alternatives that were favored by many respondents. Areas of high ecological integrity and importance to fish and wildlife species have been identified and mapped (aquatic A1 and A2 subwatersheds and terrestrial T watersheds). The management intent in these areas is to protect those that are in good condition and to restore the others to improve their condition. These areas can serve as a core of important habitats from which to build a connected network. Roads can rarely be constructed in unroaded areas, and only after a roads analysis. Other areas that have risk of resource damage and opportunity for improvement have been identified as high priority for restoration. Restoration activities are intended to occur first in those areas that are near isolated and economically specialized communities.

Adaptive management is a key feature of both Alternatives S2 and S3. Objectives and standards (Chapter 3) in both alternatives call for the use of adaptive management and monitoring, and for opportunities for scientific experimentation and field trials. Implementation of the ICBEMP decision will use an adaptive management approach—a continual process to modify plans and activities over time. Details of the implementation and adaptive management framework are provided in Appendix 10.

Although Alternative S2 has been identified as the preferred alternative, all ten alternatives (the seven from the Draft EISs plus the three from the Supplemental Draft EIS) are available for selection by the deciding officials, who may select one of those alternatives or an alternative that combines features from several.



**Comment:** The EIS should not combine pieces of existing alternatives.

**Narrative:** *Some respondents feel that the project should not attempt to combine pieces of existing alternatives to make a new one. They believe that such an attempt would lead to failure because: (1) the public would not have sufficient involvement; (2) a composite alternative would contain internal thematic conflicts since the themes of the alternatives vary; (3) all of the action alternatives contain too many prescriptive standards that are inappropriate in a programmatic plan; and (4) no alternative supports a timely active management approach.*

**Response:** Alternatives S2 and S3 represent some elements drawn from the previous alternatives; however, the management direction contained in these two new alternatives was primarily developed based on public comments, new science information, and agency direction and input. Alternative S1 is based on Alternative 2 from the Draft EISs updated with several recent biological opinions issued by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service.

**Comment:** There should be only one no-action alternative.

**Narrative:** *Some respondents suggest that the comparison of action and no-action alternatives is flawed because of the presence of two no-action alternatives. The description of no-action should be revised to reflect the actual management direction in place at this time.*

**Response:** The Draft EISs recognized the temporary nature of the direction provided by these interim directives. This provided the possibility for the EIS Team to consider two "no-action" alternatives - Alternative 1, which is a continuation of management guided by the land use plans for Forest Service- and BLM-administered lands prior to interim direction, and Alternative 2, which includes the interim direction as part of the long-term strategy. The Supplemental Draft EIS describes only one no-action alternative (S1) which reflects the current management on federal lands (Forest Service and BLM) in the project area. Alternative S1 would include the interim direction (PACFISH, INFISH and where appropriate Eastside Screens) as long-term direction on BLM- and Forest Service-administered lands in the project area.

## New Alternatives to Consider

**Comment:** The EIS should give full consideration to the Forest Service Employees for Environmental Ethics (FSEEE) plan.

**Narrative:** *Some commenters feel that the FSEEE alternative is a low-cost, low-risk alternative patterned after the Northwest Forest Plan, which they feel has been successfully implemented in the Pacific Northwest. Some cite the critical importance of combining watershed restoration with protection of riparian areas, old-growth forests, and roadless areas, which they believe is embodied in the FSEEE plan. Others believe the FSEEE plan offers an aquatic conservation strategy to restore the ecological integrity of entire watersheds, not just riparian areas or in stream habitat, and that it also proposes an extensive system of old-growth reserves and new standards for salvage logging, road building, grazing, and mining.*

*According to some respondents, the FSEEE alternative is the only one that can provide the three things that they believe an ecosystem-based plan for the interior Columbia River Basin should do: (1) establish a reserve system to protect key areas of fish and wildlife habitat, including old-growth forests and roadless areas; (2) implement strong watershed restoration and habitat enhancement measures in priority areas; and (3) restore to the fullest extent possible the important ecological role of fire and other disturbances.*

**Response:** In the development of alternatives for the Draft EISs, FSEEE presented its 1995 publication of *The AFSEEE-Sponsored Ecosystem Management Alternative for the Interior Columbia River Basin* to the project for incorporation as one of the alternatives to be analyzed in the Draft EISs. In reviewing the alternative presented by FSEEE, as well as issues identified by other publics, the EIS team used those concerns, as appropriate, that would meet the Purpose and Need for the project in the development of the original seven alternatives.

Based on comments received on the Draft EISs, the EIS Team developed and analyzed three additional alternatives (S1, S2 and S3) in the Supplemental Draft EIS, which reflect the overall issues presented by all those involved in the project, including FSEEE. NEPA



recognizes that issues drive alternatives to a proposed action and that the agencies need to analyze a "reasonable range of alternatives" that meets the Purpose and Need, addresses the public's concerns and ensures the best management of the land in the long-term. This is what is presented in both the Draft EISs and the Supplemental Draft EIS.

**Comment:** The EIS should consider the NRDC alternative, which halts commercial logging and grazing in old-growth and unroaded areas and corrects past damage in those areas with active restoration.

**Narrative:** *Some ask for endorsement of the management plan supported by the Natural Resources Defense Council (NRDC) and other conservation groups; their plan would halt commercial logging and grazing in the interior Columbia River basin's old-growth areas and in areas currently without roads. These respondents request that the agencies "undo the past damage in these areas with active restoration." Some suggest that "adopting a process with minimal trammeling by industrial society would be a viable alternative." One calls for adoption of an alternative that prescribes preservation of all roadless areas as roadless and unmanaged, a concerted program of road obliteration in areas already roaded, and a return of wildfire rather than continued fire suppression. Some respondents feel that continued commercial logging and continued heavy grazing is damaging to the ecosystem; these people feel that "we must protect our natural resources and turn a deaf ear to commercial interests."*

**Response:** The direction in the Supplemental Draft EIS seeks to promote old forest conditions and protect old forests from both natural and human-caused disturbances. The alternatives in the Supplemental Draft EIS do not prohibit all logging and grazing in old forest and unroaded areas. For areas that are unroaded or where few roads exist, the direction in the Supplemental Draft EIS states that new roads in these areas would be rare and would first require a roads analysis to take place that weighs the relative habitat values against the need to address large-scale environmental damage.

**Comment:** The EIS should consider an alternative that incorporates input received from the Columbia River Bioregion Campaign, Indian tribal nations, and others.

**Narrative:** *Some people feel the project has not included a critical alternative that flows from the science compiled by the Science Integration Teams, the objectives of the project, and input from the Columbia River Bioregional Campaign (CRBC), Indian tribal nations, and others. They note that the CRBC alternative would involve carefully selected restoration actions which are closely monitored and would involve varying levels of activity and controls in some areas, so that management is always tentative, adaptive, and comparable to natural processes. To these respondents, large, well-functioning and recovering areas within which natural processes can predominate, should be protected and restoration activities should be undertaken lightly, appropriately, and non-commercially wherever possible. They feel that non-motorized recreation should be emphasized in this alternative. They ask the EIS Team to seriously consider the CRBC's call for a fully funded ecosystem alternative that protects migration corridors, old-growth forests, and key watersheds.*

*Some respondents feel that the Draft EISs must be revised to include evaluation of at least one alternative that has high levels of active restoration of road networks in watersheds with anadromous fish and a suspension of road construction as recommended. They feel that the EIS must include an alternative that completely protects RCAs from degradation from logging, road construction, mining, and grazing in all watersheds with anadromous fish, because these actions are essential to rebuilding anadromous fish runs and providing some contribution toward viability. They state that such an alternative is needed for tribes to credibly assess the effectiveness of reasonable approaches to protecting and restoring anadromous fish habitats consistent with federal trust responsibilities, the Clean Water Act, and other applicable laws.*

**Response:** Many of the concepts offered by various organizations and other governmental agencies, including tribal governments, have been incorporated into Alternatives S2 and S3. They can be found in the direction for aquatic A1 and A2 subwatersheds and terrestrial T watersheds to protect and restore aquatic and terrestrial habitats and meet other requirements of laws and treaties.

**Comment:** The EIS should consider an alternative that incorporates Oregon Governor Kitzhaber's 11-point timber plan.



**Narrative:** *Some suggest the team look closely at Oregon Governor Kitzhaber's 11-point timber plan, which calls for protection of remaining old-growth stands, protection of riparian and roadless areas, and generally advocates a closer look at what constituents and professional scientists are saying.*

**Response:** Many of Governor Kitzhaber's 11-points are compatible and consistent with Alternatives S2 and S3. The intent of many standards, objectives, and guidelines is to improve ecosystem health through the maintenance and restoration of riparian, forest, and rangeland vegetative structure and composition, or what Governor Kitzhaber refers to as active management. In addition, adaptive management, monitoring and review are vital components of both Alternatives S2 and S3. Appendix 10 contains more information on the adaptive management and monitoring framework.

**Comment:** The EIS should consider an alternative that incorporates input received by the Deschutes Provincial Advisory Committee.

**Narrative:** *Some support the approach to the alternatives presented by the Deschutes Provincial Advisory Committee. They believe that the Alternative 4 'active restoration' approach will begin to meet the federal trust responsibility if it is modified to include certain objectives found in Alternatives 5, 6, and 7 regarding harvestability of culturally significant fish, wildlife, and plants, including the establishment of reserves that will promote hydrological integrity of anadromous fish-yielding streams.*

**Response:** The direction in the alternatives developed for the Supplemental Draft EIS incorporates many of the concepts that were included in the Draft EISs and is also responsive to the comments received by the Deschutes Provincial Advisory Committee.

**Comment:** An alternative should be developed that would allocate specific areas for emphasis of certain management priorities.

**Narrative:** *Some respondents strongly recommend developing a new alternative that identifies specific locations in the interior Columbia River basin where commodity extraction and other human uses such as grazing and recreation would be emphasized. They say that such an approach could assure predictable future outcomes and successfully meet habitat needs while providing for human uses.*

**Response:** Alternative 5 in the Draft EISs assigned timber production, forage production, wildlife, fish,

and recreation management emphases or priorities to "priority areas" most suited for particular uses.

Alternatives S2 and S3 prioritizes areas for aquatic and terrestrial species health, and other areas for restoration activities. An emphasis is placed on conducting management activities near isolated, economically specialized communities first.

**Comment:** A new alternative should be included that involves a broad cross-section of management themes across the planning area (such as Conserve, Conserve/Restore, Restore, Restore/Produce, Produce/Conserve themes).

**Response:** The concept of Conserve/Restore / Produce management emphases in range and forest clusters was not brought forward to the Supplemental Draft EIS. Alternatives S2 and S3 in the Supplemental Draft EIS identify areas of priority for aquatic and terrestrial species health, as well as areas of priority for restoration activities.

**Comment:** An alternative should be developed with management actions that contribute to species recovery and preclusion of future listing.

**Narrative:** *Some respondents recommend that the EIS include an alternative with management actions that contribute to species recovery and that preclude future listings. Standards and objectives which assure the recovery and conservation of all proposed and listed species in the project area should be developed.*

**Response:** To the greatest degree possible, analysis and management direction is built into Alternatives S1, S2, and S3 to reduce the potential to list additional species, where all or a major portion of the species population resides on federal lands. In addition, the intent of the EIS is to provide the necessary direction to contribute to species recovery. This intent is clearly written into the goals for the project in Chapter 3.

## Specific Alternatives

**Comment:** Comments diverge on the validity of Alternative 1.

**Narrative:** *Some feel that Alternative 1 is simply 'business-as-usual' and does nothing to fulfill the purpose and need of restoring ecosystem health; they believe that in the long-term it also will not provide a reliable flow of goods and services. Other respondents see Alternative 1 as*



*invalid as a true "no-action" alternative because the land management agencies have already agreed to implement PACFISH and INFISH, and decisions would have to be made to cease the implementation of those interim strategies; therefore, it does not have value for comparing action alternatives.*

*Others feel that current management probably now represents the collective values of how the public wants Forest Service- and BLM-administered lands managed, and they feel the alternative maintains access for producing commodities. Some feel strongly that Alternative 1 is the most appropriate alternative for managing the project area public lands.*

**Response:** Alternative 1 in the Draft EISs was included as a legally required no-action alternative against which to compare the proposed action alternatives. As a no-action alternative, Alternative 1 was neither intended nor required to fulfill the Purpose and Need and did, intentionally, represent "business as usual." Alternative 1 intentionally does not contain the provisions of PACFISH, INFISH, and Eastside Screens because these are interim measures; it was necessary to present and evaluate the consequences of continuing management direction that existed before any modification occurred. However, recognizing that the interim measures have, in fact, been in place for some time, a second no-action alternative (Alternative 2) that does include those provisions was presented in the Draft EISs to enable a full comparison to both situations.

In the Supplemental Draft EIS, Alternative S1 is similar to Alternative 2 from the Draft EISs, but it is updated with the addition of the Biological Opinions issued by the National Marine Fisheries Service and U.S. Fish and Wildlife Service since the release of the Draft EISs.

**Comment:** Comments diverge on the validity of Alternative 2.

**Narrative:** *Relatively few comments were received on Alternative 2, with most people feeling it contains the same problems as Alternative 1, with additional constraints to management approaches. Others feel since Alternative 2 is essentially a "no change" alternative, calling for implementation of existing plans and adherence to PACFISH and INFISH.*

**Response:** The relationship between PACFISH/INFISH and Draft EISs standards have been clarified in the Supplemental Draft EIS in the discussion on Alternative S1. PACFISH/INFISH were originally

analyzed and documented in an environmental assessment rather than an EIS because of their interim nature. Considering them here in the EIS process identifies their consideration as long-term direction in the project area.

**Comment:** Alternative 3 should be chosen as the selected alternative.

**Narrative:** *Alternative 3 received few comments. Some people recommend selection of Alternative 3 because of what they perceive to be its cost-effectiveness, immediacy, and retention of a moderate amount of harvesting activity.*

**Response:** Alternative S2 has been identified as the preferred alternative. Of the 10 alternatives considered, the decision makers feel Alternative S2 best meets the Purpose and Need.

**Comment:** Comments diverge widely on the validity and reasonableness of Alternative 4.

**Narrative:** *The Draft EISs preferred alternative, Alternative 4, received the most comments of all the alternatives. Some feel it represents a reasonable compromise between social demands for commodities and ecosystem health. Others question whether restoration activities will truly resemble ecological processes, especially in areas which already have high ecological integrity or are capable of recovering by themselves. Others feel that the Final EIS needs to explain the active management activities which will be promoted and how they differ from past management activities.*

**Response:** As part of the National Environmental Policy Act process, comments received on the Draft EISs assist the Forest Service and BLM to gain a better understanding of the public's concerns on the future management of Forest Service- and BLM-administered lands. This input, as well as other issues raised by the public, resulted in the development of the three alternatives presented in the Supplemental Draft EIS. The objectives, standards, and guidelines for each alternative have been developed to assist local land managers in deciding which management activities (both active and passive) should be implemented in an attempt to resemble ecological processes.

The Supplemental Draft EIS attempts to better clarify what management activities will be promoted through the alternatives. Much of the management direction from Alternative 4 was included in Alternative S2. In addition, the management intent was clarified and new direction was added.



### **Comment: Comments diverge on the validity of Alternative 5.**

**Narrative:** *Alternative 5 is considered by some to be very similar to Alternatives 1 and 2, but they feel it moves too slowly toward ecosystem restoration. For many, the acceptability of this alternative remains unknown until it is "incorporated into local Forest Service and BLM land use plans." These respondents feel that it is not possible to determine the sustainability and predictability of timber benefits until forest plans are completed at some undefined future time.*

**Response:** The selected alternative will amend the current land use plans to meet the long-term goals and objectives of the project. The objectives, standards and guidelines will assist local land managers in deciding which management activities (both active and passive) should be implemented to address the need for sustainability and predictability of commodity products as well as amenities and services.

### **Comment: Comments diverge on the validity of Alternative 6.**

**Narrative:** *Some respondents favor Alternative 6 but feel some areas should be designated as control points to evaluate different types of commodity use. Others like the slower and more cautious approach and feel it offers the best benefits to aquatic resources.*

**Response:** An adaptive management approach, similar to what was intended in Alternative 6, with options for controlled experiments as well as informal field testing and evaluation, form a key part of both Alternatives S2 and S3. More information about the adaptive management and monitoring framework can be found in Appendix 10.

### **Comment: Comments diverge widely on the validity and reasonableness of Alternative 7.**

**Narrative:** *A number of people feel that too many of the areas designated to be reserves in this alternative are too degraded to fulfill their purpose, or they feel that areas with high ecological integrity were not included. Others suggest that the reason "Alternative 7 performs so poorly" is that it lacks many of the basic restorative programs and management safeguards that are included in other alternatives. These respondents feel that "active management and reserves are not mutually exclusive," and that many of the Alternative 7 reserves that encompass roads would likely benefit from more active restoration.*

*Some respondents state that Alternative 7 needs further clarification. They note that while the alternative proposes a strategy that would protect large tracts of high quality habitat for the conservation and restoration, it fails in their opinion to: identify specific areas for protection, give clear direction for consistent identification of lands to be set aside, or propose a process of allocation as a means for reconciling conflicting land uses.*

*Respondents feel that by relying on wildfire to restore forest and rangeland conditions and by preventing road restoration and weed management, the framers of Alternative 7 designed an alternative that was guaranteed to receive low marks. They feel this alternative never had a chance and therefore fails to contribute to a range of reasonable alternatives.*

**Response:** Alternative 7 presented a less intrusive approach to the management of Forest Service- and BLM-administered lands. The effects of implementing this reserve-oriented alternative were disclosed in the Draft EISs. The action alternatives in the Supplemental Draft EIS provide a different approach to protecting aquatic and terrestrial habitats, through the identification of aquatic A1 and A2 subwatersheds and terrestrial T watersheds, where low risk would be accepted. In addition, subbasins that are a high priority to restore are identified where more activities, including prescribed fire, would occur.

## **Desired Range of Future Conditions**

### **Comment: Desired Range of Future Conditions cannot accurately predict how landscapes and society will change over the next 50 to 100 years.**

**Narrative:** *Many question the validity and usefulness of the Desired Range of Future Conditions (DRFC). They feel that any predictions of the future will fail because we cannot predict how landscapes and society will change over time. They argue that new laws and policies, and technological changes in energy, transportation, communication, and agriculture, will make the year 2150 as different from today as today is from 1850. One person suggests using only 50 years for the maximum, as the Forest and Rangeland Renewable Resource Act does. Others argue that the DRFC should vary among clusters and communities.*

**Response:** The DRFCs were intended to only show expectations of what the land, resources, social and economic conditions would be like sometime in the future. As society changes, and new laws are imple-



mented, changes to local land use plans will occur to reflect this through the appropriate planning process. The overall intent is to allow for an improvement to the lands administered by the Forest Service and BLM. In order to minimize confusion about the use of DRFCs, the Supplemental Draft EIS incorporates the descriptions of desired outcomes into the actual objectives or their rationales.

**Comment:** There is no scientific data to prove that the condition of these lands in the 1850s was ideal; therefore, historical range of variability should not be used as a guide for establishing DRFCs.

**Narrative:** *Many are upset that the concept of historical range of variability (HRV) was used in the Draft EISs. The use of HRV tended to confirm their perceptions that the project's implementation would make the basin look as it did in 1850, with perhaps only Native Americans left. They feel that European settlers and people since then have greatly increased the productivity and health of the land; they use as examples: dams have prevented flooding and riverbed scouring, and other developed water sources and agriculture have afforded some wildlife a much larger range. They question how anyone could know the exact conditions of that earlier time period, and if they did, how any estimate of variability could be made. Some argue that no scientific estimate of existing ecological health can be made, and certainly no estimates can be made of previous ecosystem health.*

**Response:** The historical range of variability (HRV) was not intended to be interpreted as representing ideal conditions. As described in Chapter 2 of the EIS, HRV was used only to represent ecological conditions and processes that scientific evidence suggests occurred prior to settlement of the project area by Euroamericans in the mid 1800s. These conditions, which always have varied between some high and low points, were selected only as a baseline set of ecological conditions for which sufficient scientific or historical information was available to enable comparison to current conditions. For purposes of the project, areas that were found to be significantly different from historical conditions (outside the high or low points that would have been expected based on what we know of the past) were considered to be more in need of restoration to allow ecological processes and functions to operate well and provide the goods and services that humans desire. This information helped the EIS Team understand important broad-scale changes in vegetation, wildlife and fish habitats, water quality, and other resources, which in turn helped them design management strategies that would best

restore and maintain ecological processes and functions across the project area.

## Objectives and Standards

**Comment:** The clarity of the objectives and standards needs to be improved and the EIS needs to clarify an apparent contradiction regarding the flexibility of standards.

**Narrative:** *Some respondents note that navigating Table 3-5 was so difficult it needed a seven-page index. Some say that the relationship between objectives, standards, and guidelines is not clear and will result in confusion during implementation. Some feel that the EIS Team must provide a clear display of the spatial relationship of how the objectives, standards, and guidelines relate to landscape-level management. Some feel that most of the objectives, standards, and guidelines are vague, without clear purpose, or they create management conflicts.*

*They ask that the EIS clarify the assumption that "objectives will be implemented within 10 years" – whether this refers to full accomplishment of objectives, or initiation of work toward them. They suggest that work toward meeting objectives needs to begin immediately after a Record of Decision, and their progression through 10 years needs to be displayed.*

*One respondent notes that there is no "clear road map" in the objectives and standards that tells how the management plan will unfold, and that clarification of how implementation of the standards, objectives, and guidelines will lead to desired future conditions is needed. Another respondent feels that the standards in the Draft EISs do not meet the definition identified in the National Environmental Policy Act as the minimum criteria for mitigation measures; it is felt that the standards here largely dictate process, not the prevention of certain future impacts, minimization of environmental impacts, or mitigation.*

**Response:** Table 3-5 was not carried forward to the Supplemental Draft EIS. The objectives and standards for Alternatives S1, S2, and S3 are provided in an easier-to-read format. A definition and description of the relationship between objectives, standards, and guidelines is located in the Key Terms box at the beginning of Chapter 3 of the Supplemental Draft EIS.

Objectives, standards, and management intent are all considered management direction to be followed. Only guidelines are optional direction to be considered as suggestions on how to meet the standards, objectives, and management intent. In addition, a



hierarchy of management direction was developed and is outlined in Chapter 3. The hierarchy is intended to minimize conflicts between overlapping direction. This programmatic EIS is intended to provide broad-scale direction while providing local managers flexibility in meeting the management intent.

**Comment:** Stronger, more enforceable standards should be provided.

**Narrative:** *Respondents feel that the Draft EISs do not include "rules (standards)" adequate to guide on-the-ground management to achieve landscape restoration and species conservation. Without firm standards, they feel, "the agencies are likely to continue with the business-as-usual management that degraded these land and waters over the past 100 years." Some respondents feel that enforceable standards, by definition, must contain explicit time lines for implementation, must contain explicit wording laying out standardized procedures to determine compliance, and must commit agency personnel to clearly defined, non-discretionary "action triggers."*

**Response:** The direction for each alternative (S1, S2 and S3) has been developed to meet the long-term goals outlined in Chapter 3, but the level and intensity of management varies between the alternatives. Each alternative has a variety of objectives, standards, and guidelines requiring land managers to meet the needs of the land and the project's Purpose and Need, yet allowing them the flexibility to pick and choose those activities that are appropriate at the local level. Objectives and standards are mandatory for land managers to use when implementing projects, thus meeting the "enforceable" concern voiced by some of the public. The ultimate goal is that following the direction outlined here, in conjunction with local land use plans, will result in the protection needed that is best for the resources.

**Comment:** Some standards conflict with each other.

**Narrative:** *Some respondents feel that standard TS-S3 may conflict with TS-S1 regarding conversion to non-native species. They also ask for a definition of "ecologically appropriate species" under TS-S2. Others suggest that standard TE-S9/A1 limits on even-aged openings less than 40 acres could conflict with TE-S16/A1 and TE-S17/A1, especially if open, single-storied stands are desired to provide big game winter range or to rehabilitate rangelands invaded by conifers.*

**Response:** Comments such as these helped the EIS Team remove conflicts and redundancy between the

standards. Changes in the standards and guidelines are reflected in Chapter 3 of the Supplemental Draft EIS. As for the definition of "ecologically appropriate species" these are species which were part of the historical context of the ecosystem and those introduced species (such as brown trout) that play an integral and beneficial role in the ecosystem, both ecologically and socially, over the long term.

## Comparison of Alternatives

**Comment:** The evaluation criteria and indicator variables are not objective and don't represent the issues people care about.

**Narrative:** *Some respondents feel that the EIS Team needs to address the degree to which the alternatives addressed each goal. These people didn't feel that the evaluation criteria or indicator variables were objective or representative of the issues people care about. Attempting to compare alternatives at such a broad scale with subjective criteria is neither practical nor meaningful because of the amount of guesswork and aggregation involved.*

**Response:** The alternatives in the Draft EISs and the Supplemental Draft EIS were reviewed by the Science Team to have an independent science evaluation. The EIS Team developed a set of evaluation criteria based on the Purpose and Need statement, issues, goals, and public comments and concerns, to help guide the evaluation of alternatives. The EIS Team and the Science Team then jointly agreed on a set of indicator variables (quantitative, objective measures of ecological, economic, and social conditions), which were used in the evaluation.

The Science Team and the EIS Team evaluated alternatives on the basis of the data and relationships described in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), which included published and unpublished research, studies, and reports. Conclusions regarding future conditions were based partly on a series of computer models to simulate the management direction as it would reasonably be implemented during the next decade (short term) and the next century (long term). Many of the models were developed as part of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) or the *Evaluation of EIS Alternatives* (Quigley, Lee, and Arbelbide 1997). Some new models were developed specifically for the analysis of the Supplemental Draft EIS. Inferences were based on available information and model results.



# Collaboration/ Involvement

## Public Involvement/ Adequacy of Process

**Comment:** The process for public involvement in the project and subsequent plan modifications should be clearer and more accessible.

**Narrative:** *Most individuals who commented on the adequacy of the project's public involvement process agree on the importance of public input. But many are frustrated with the process for public collaboration and suspect their input is not being considered by government decision makers.*

*There is concern among many people that the very size of the document and supporting data is so large that it discourages participation and understanding. If the local impacts of each alternative were presented in a clear and accessible format, some suggest, the public could more easily identify their concerns and offer constructive comment.*

*Throughout the 11-month comment period, many respondents requested that officials extend the time for public comment.*

**Response:** During the public comment period, nearly 40 public meetings were held and more than 70 briefings were given to many different constituents. At the beginning of the public comment period, nearly 1,000 people viewed an information-sharing teleconference, produced by the project and broadcast to more than 60 communities in the project area. The *Assessment of Ecosystem Components*, Draft EISs, and the *Final Analysis of Public Comment* are all located on the project's website, as well as in many public libraries. Since the public comment period began in June 1997, more than 2,500 copies of the Draft EISs have been distributed. Also since that date, 11 issues of the project newsletter have been mailed to more than 7,000 people, providing periodic updates on the project.

More than 83,000 public comments on the Draft EIS were received, reviewed, and analyzed. Alternatives S2 and S3 in the Supplemental Draft EIS were developed using ideas, concepts, and suggestions received from the public, new science information, and internal (Forest Service and BLM) input.

**Comment:** Input from the public residing within the project area should be more influential than input from outside the project area.

**Narrative:** *Some feel that comments from the public living within the project area should be more influential than those from outside the project area. One person suggests that comments from outside the project area be separated because more distant people have a less crucial stake in the outcomes. Others state the opposite, that since public lands belong to the entire nation, the entire American public should have a say in decisions concerning public lands. To some, the level of comment on an issue is not an indication of public sentiment, but merely a reflection of the political campaigns of interest groups which have mailed thousands of form letters aimed at influencing the process.*

**Response:** By law, comments are considered based on their content and substance rather than by where they come from or how many there are. In part, this is because public comments are not a valid statistical sample of how all people with a stake and interest in federally administered lands feel about the management of those lands. The number or origin of comments cannot be used as a 'vote' or a way to unduly influence federal officials.

**Comment:** The project should continue its methods for public involvement, updating these methods when possible.

**Narrative:** *A few people approve of the use of newer technology to present project information, and offer suggestions to make it work better. For example, at least one suggests that the EIS could be divided into smaller on-line documents, each with a table of contents. This would enable computer users at home to download and print their particular areas of interest, rather than the entire document.*

**Response:** Use of up-to-date technologies (such as video teleconferences and the internet), as well as standard public meetings and newsletters, have been used to update people on the project. Most of the published project documents, updates, newsletters, and news releases have been posted on the project website in an easily accessible format; the Draft EISs are divided into chapters on the website.

**Comment:** The project staff should be more informative and more interactive with the audience at their public meetings.



**Narrative:** *While some appreciate government efforts, such as public meetings, designed to clarify the project, others say they wish the public's questions could be better answered at the meetings. Many say such meetings provide only a one-way flow of information from the government to the public, rather than an opportunity for the public to express their concerns to government officials. Some people believe the public input process began only after a list of alternatives was presented to them and state they could have participated in the process more effectively if they had been invited from the start.*

*Many suspect the government has already made its decision under pressure from well-funded interests. Some feel the process for public collaboration is more an exercise in propaganda than a real quest for the public's concerns. Some suspect the cumbersome and confusing nature of the documents conceals an ulterior motive, such as a deliberate attempt to exclude the public from interfering with implementation of decisions already made.*

**Response:** During the formal EIS scoping period in 1994 and 1995, the project held 17 scoping meetings plus a far-reaching video teleconference broadcast simultaneously to 27 meeting locations across the project area. Besides these, more than 20 general public meetings were held prior to the release of the Draft EISs. Public meetings have been structured to include extensive question-and-answer periods as well as general project updates. The project has strived to use an open public process since its inception and take valid input into account throughout the development of the EIS. Project staff and other agency employees attempt to provide adequate answers but may occasionally need to refer technical questions to specialists on the EIS Team and the Science Team.

## Relationship to Other Planning Processes

### Relationship to Existing Forest Service and BLM Land Use Plans

**Comment:** Existing local Forest Service/BLM planning processes should be relied upon because

of perceived conflicts between the EIS and local plans and processes.

**Narrative:** *Many respondents note that Forest Service and Bureau of Land Management administrative units already have their own plans as mandated by the National Forest Management Act (NFMA) and Federal Land Policy and Management Act (FLPMA). They feel that these local land use plans enjoy broad local support, use valid scientific methods, and are the result of years of hard work, planning, and compromise. Respondents worry that a decision made on this large a scale will prohibit flexibility for local managers when appeals and litigation already have prevented implementation of many such local plans. Many people think the selected alternative in the EIS will supersede these plans, which some state would violate NFMA and FLPMA (which establish rules for revising or amending plans) and also add yet another layer of regulation and procedure many see as unnecessary.*

*Others are concerned that strategies and commodity output levels established in the individual plans will be superseded by the EIS's more general broad-scale output goals. Suggestions are made to provide a well-defined land use plan amendment/revision process before proceeding with an EIS or Record of Decision. Respondents want to know how this new approach will improve the ability of the agencies to withstand legal challenges to existing plans; they want a full discussion of this topic to be precise and clear and not buried in an appendix.*

**Response:** The project has followed the planning processes prescribed in regulations for the Forest Service (36 CFR 219) and the Bureau of Land Management (43 CFR 1610), including the process for amending land use plans. From the outset the project has stated that this planning action would amend Forest Land and Resource Management Plans and BLM's Resource Management Plans and Management Framework Plans (collectively referred to as land use plans). Alternatives in the Supplemental Draft EIS (S2 and S3) simplify direction by focusing on four basin-wide components: aquatic habitat; terrestrial species habitat; landscape health; and human needs, products, and services. A hierarchy of management direction has been added to Chapter 3. It explains that existing land use plans provide the management foundation for the project area and that much of that foundation, especially the finer-scale direction, will remain unchanged by the Record of Decision. The hierarchy of management, together with the step-down process for bringing broad-scale direction down to the local level (national forest or BLM District), are intended to meet the need for a well-defined plan amendment and implementation process.



**Comment:** The EIS should describe how the selected alternative will affect certain provisions in existing Forest Service/BLM land use plans (outputs, allocations, etc.); the EIS should not be used to modify commodity outputs of local Forest Service/BLM land use plans without adequate analysis.

**Narrative:** *Some respondents feel that, at a minimum, the Draft EISs must show how the alternatives will affect the existing forest plan resource output schedules, and explain the procedures and outcomes whereby the project direction will be integrated with forest plans and project analyses. Some note that National Forest Management Act requires that these tradeoffs be considered during a significant forest plan amendment, and they find it remarkable that the Draft EISs "make no estimate of effects for individual forests which would provide for meaningful comparisons to existing forest plans." They feel that the Draft EIS assignment of management output emphasis to clusters affects which lands are suitable for timber production and the level of resource outputs, but NFMA and forest plans prohibit changing the land assignments to management areas and management emphasis without revising the forest plan. These respondents feel that rather than serving as a foundation for efficiency, such a process will generate additional headaches, noting that "from a resource user's standpoint, the specter of a plan that cannot be implemented to produce tangible outputs, being overlaid on a suite of nearly dysfunctional plans, is a nightmare."*

*Some feel that providing specific data in Table 3-6 sets up unreasonable expectations for the public that may drive future decisions regarding timber outputs. Some people feel that Tables 3-6 and 3-7 essentially revise the commodity outputs, such as timber allowable sale quantities, in current land use plans, without mid-level or fine-scale analysis. Others feel that the EIS is incomplete without an estimation of Allowable Sale Quantity (ASQ) or Probable Sale Quantity (PSQ) of timber. They believe that communities need to know if predictable levels of harvest will continue year to year so that banks will have the needed criteria to make loan decisions and so that governments and schools can draft their annual budgets. Others allege that changes in Allowable Sale Quantity and Probable Sale Quantity can and should be estimated to provide more accurate information in the analysis, such as how many mills will close. To ensure ASQ and other outputs will be achieved, some believe the Forest Service and BLM must commit to a legally binding plan. A few point out the required schedule of forest level outputs as required by NFMA are not disclosed.*

**Response:** Existing land use plans provide the management foundation for the lands administered by the Forest Service and BLM in the project area. Much of that foundation, especially the finer-scale

direction, will remain unchanged by the Record of Decision. The hierarchy of management, together with the step-down process for bringing broad-scale direction down to the local level (forest or district), is intended to meet the need for a well-defined plan amendment and implementation process. It is during the plan revision or amendment process that the schedule of forest-level outputs would be disclosed.

The EIS does not propose to change existing land allocations. An estimation of effects on the levels of goods and services can be found in Chapter 4. Any changes in the level of goods and services attributed to the selected alternative can be compared with Alternative S1 (description of the current situation).

The revised strategies (Alternatives S2 and S3) in the Supplemental Draft EIS include a more detailed description of how local Forest Service and BLM managers and their staffs can take the broad-scale information and management direction, and "step it down" to mid- and fine scales. The step-down processes allow local managers to consider site-specific conditions when designing activities to meet broad-scale expected outcomes.

Activity Tables 3-6 and 3-7 were generated for the Draft EIS to provide a basis for evaluating the effects of the alternatives. They have been replaced in the Supplemental Draft EIS with a series of "storylines" which the EIS Team provided to the Science Advisory Group (SAG) as guidance for modeling activities, based on the management intent and direction in the EIS. The storylines can be found in Appendix 14.

**Comment:** The EIS should explain its relationship with the Federal Wildland Fire Management Policy and Program Review.

**Narrative:** *Some maintain that the Federal Wildland Fire Management Policy and Program Review mandates the use of fire in certain areas. These respondents question whether the EIS will conflict with this plan.*

**Response:** The *Federal Wildland Fire Management Policy and Program Review* was chartered by the Secretaries of the Interior and Agriculture in response to the challenge of managing the increasing complexity and magnitude of wildland fire in the United States (USDA and USDI 1995).

The *Review* addressed major topic areas, guiding principles that are fundamental to wildland fire management, and recommended a set of 13 federal wildland fire policies. The proposed federal policies were developed as an "umbrella" that do not replace



existing agency-specific policies but compel each agency to review its policies to ensure compatibility. Individual agency policies are reflected through the land and fire management planning processes, as well as by manual direction.

The *Review* covered five topic areas: (1) the role of wildland fire in resource management, (2) the use of wildland fire, (3) preparedness and suppression, (4) wildland/urban interface protection, and (5) coordinated program management. The *Review* does not mandate any particular fire management action in any particular geographic area, or on any land allocation or land use. However, it encourages the use of fire in its natural ecological role, where it is consistent with other land and resource management objectives, as well as with other social concerns and objectives (such as safety, risk management, air quality management, and economic efficiency). Furthermore, the use of fire must be consistent with agency policy.

The Supplemental Draft EIS is consistent with the recommendations of the *Federal Wildland Fire Management Policy and Program Review*. This is demonstrated by the incorporation of the role of fire as an ecological process and natural change agent, and the inclusion of newly available scientific analyses (such as in Chapter 3 of *An Assessment of Ecosystem Components* [Quigley and Arbelbide 1997]).

**Comment:** Before an EIS and Record of Decision are signed, administrative planning rules should be modified to regulate and direct broad-scale analysis and decisions.

**Narrative:** *A county representative finds it "noteworthy [that] the planning has occurred prior to the development of any guidelines or direction for planning at this scale." This respondent asks how a Record of Decision can expect to amend current BLM and Forest Service land use plans at various levels when each has a different administrative process to follow for making amendments. The commentor feels that an EIS is not an appropriate vehicle for setting policy, and that people must either follow existing regulations or amend the regulations before going around them.*

**Response:** The guidelines or direction for planning at this scale are found in *A Framework for Ecosystem Management* (Haynes, Graham, and Quigley 1996). The process for making plan amendments, as detailed in planning regulations of the two agencies (36 CFR 219 for the Forest Service, and 43 CFR 1610 for the Bureau of Land Management) is virtually the same up to the point of administrative remedy associated with the decision. The Forest Service signs the record of decision and then offers a 30-day period in which to

appeal the decision. The Bureau of Land Management circulates a proposed decision and offers a 30-day period in which to protest before the Record of Decision is signed.

The two agencies are exploring ways to use the same administrative process for appeal/protest. Using one process would be more efficient, ensuring that both agencies arrive at the same decision. Whichever process is used, it will allow other agencies or the public to make known their views on the decision or proposed decision and offer a real opportunity to alter the decision.

## Relationship to Interim Strategies (PACFISH, INFISH, and Eastside Screens)

**Comment:** Public comments diverge on whether the EIS should rescind, incorporate, or improve upon the interim strategies (PACFISH, INFISH, and Eastside Screens).

**Narrative:** *PACFISH, INFISH and the Eastside Screens are interim strategies involving management methods designed to protect salmon, wildlife, and old forests in the project area. A few respondents comment on these plans, but people disagree on whether the EIS should rescind them, continue them with no further direction, or improve upon them with more stringent standards.*

*Some say these interim plans have hurt local economies and they want to see the interim guidelines dropped. Individuals suggest there will be a significant reduction in timber produced from the basin if these standards are employed. Surrounding communities, they declare, will face economic hardship and severe distress as a result.*

*Others feel that existing programs such as state Best Management Practices (BMPs) combined with PACFISH/INFISH already provide sufficiently strict controls over activities that could affect aquatic health, so no further direction is necessary. Some feel the replacement standards in the Draft EISs are even more restrictive than PACFISH and INFISH. Claiming that the agencies are simply reiterating these interim guides in a new format, some individuals request that these strategies be replaced with functionally based approaches. They feel that these measures are not based on science. One respondent feels that the Forest Service should remove all the interim guidelines and use the existing forest plans.*

*While many feel that the riparian protections in these interim measures are necessary and that the EIS should incorporate them, some are suspicious that the Eastside*



*Screens in particular will be used improperly to exempt ongoing activities if the activities make it through the screening process.*

*Others feel the EIS should permanently adopt INFISH and PACFISH standards to protect fish habitat for the long-term, unless there are defensible biological rationales from the agencies for moving away from these interim strategies. Some individuals believe that none of the alternatives in the Draft EISs include RCA widths safe for anadromous fish populations. They assert that grazing, clear cutting, mining, and road construction on channel banks, should not be allowed within these RCAs. Some say that the EIS should include a discussion of the applicability of PACFISH RMOs for project area streams within the RMO discussion for Alternatives 2 and 3.*

**Response:** The interim strategies (PACFISH, INFISH, and Eastside Screens) were initiated to preserve future management options until permanent direction, in the form of the ROD based on this EIS, replaces it. The interim strategies take a one-size-fits-all approach to halt the decline of aquatic and terrestrial habitats and begin the recovery process. Because of this, many of the interim directions are purposely restrictive because they were only meant to be in place for the short term while this long-term strategy was developed. The Record of Decision will permanently replace PACFISH, INFISH, and the Eastside Screens.

Where appropriate to the intent of the long-term strategy, specific direction from the interim strategies has been incorporated into the action alternatives (Alternatives S2 and S3). In addition, some specific elements of the interim strategies are incorporated as interim or "default" standards in Alternatives S2 and S3.

Management direction is provided for RCAs in the Supplemental Draft EIS (Chapter 3), to conserve and restore aquatic and riparian-dependent resources. Management activities, such as silvicultural treatments, livestock grazing, and road construction, would have to be modified or eliminated if they take place in or would affect RCAs such that existing RCA conditions would not be maintained or improved and the activities would not meet the intent of ICBEMP standards and objectives.

**Comment:** The economic analysis for the Draft EISs didn't completely or properly address the social and economic effects of the interim strategies (PACFISH, INFISH, Eastside Screens).

**Narrative:** Some respondents claim that the interim strategies (PACFISH, INFISH, and Eastside Screens) have

*negatively affected thousands of jobs. They interpret the Draft EISs as saying that these strategies will be discontinued with signing of the Record of Decision, yet they believe that the interim guidelines are incorporated into the EIS standards, objectives, and guidelines. They note that we already have some history with the economic and social impacts of these strategies, but that such information, they believe, has not been completely or properly addressed in the economic analysis.*

**Response:** The effect of imposed restrictions from the interim strategies on federal timber sales through the interior Columbia Basin was recognized explicitly in the discussion of decreased wood manufacturing employment in the Draft EISs, Chapter 2.

The Draft and Supplemental Draft EISs present several alternatives to display the social, economic, and other effects of keeping the interim strategies, such as replacing them with more restrictive standards and guidelines as well as standards and guidelines that allow higher levels of resource production and use. Alternative 2 in the Draft EISs and Alternative S1 in the Supplemental Draft EIS were designed to continue PACFISH, INFISH, and Eastside Screens. Other alternatives address different standards, objectives and guidelines to achieve soil productivity, water quality, and species viability requirements, and to address management objectives.

The discussion of estimated timber harvest levels and the associated wood manufacturing employment in the Draft EISs uses a base period that included several years that did not reflect implementation of PACFISH, INFISH, and Eastside Screens. This problem is noted in the Draft EISs. However, the action alternatives were not recalibrated. The Supplemental Draft EIS uses a correct base period for all alternatives.

Following the release of the Draft EISs, the report *Economic and Social Conditions of Communities* (1998), was published to more completely address the social and economic effects of the alternatives at the community level. Effects of the interim strategies as incorporated into Alternative S1, are disclosed in Chapter 4 of the Supplemental Draft EIS.

**Comment:** The EIS needs to be clear about whether the objectives and standards of the Northwest Forest Plan apply to all alternatives in areas of overlapping jurisdiction.

**Narrative:** Respondents ask that the EIS state clearly that where the project and Northwest Forest Plan (NWFP) overlap, entire watersheds should be managed under the Northwest Forest Plan. They note that while Chapter 1 of



*the Draft EISs explains that the EIS would not supersede the Northwest Forest Plan without specific, subsequent amendments to the NWFP, Chapter 3 describes the NWFP as a component of Alternative 1, but does not mention it under any other alternatives. They feel that clarification of the relationship between the two plans is needed.*

**Response:** The ICBEMP decision will not apply where the Northwest Forest Plan is in effect. The Northwest Forest Plan decisions will not be superseded by the ICBEMP Record of Decision. The wording in Chapter 1 has been revised to improve clarity and understanding.

## Relationship to Other Planning Processes

**Comment:** The EIS should evaluate and clarify its relationship with, and incorporate where appropriate, provisions of local, county, state, tribal, and other federal plans.

**Narrative:** *Many believe that the Draft EISs do not recognize many existing local, state, and federal plans, disrupting plans that they believe work, causing overlap, and creating conflicts. Some claim the Draft EISs do not recognize the successes of other plans, such as Best Management Practices in Montana and numerous county zoning or land-use plans. Some are simply mystified by what they see as the project's apparent ignorance of plans that some think carry the weight of law.*

*A few respondents claim that the EIS is strikingly similar to the Northwest Forest Plan (NWFP), which they feel is destructive to western Oregon; they urge the EIS Team not to emulate it too closely. Among federal plans, at least one respondent notes that the EIS does not take into account findings of the Northwest Power Planning Council. Some respondents feel that the Draft EISs do not include the Columbia River Systems Operation Review Final EIS (1995) from the U.S. Army Corps of Engineers and the Bureau of Reclamation, or the Wy-Kan-Ush-Mi Wa-Kish-Wit (1995). Both of these documents are said to encompass the same ecosystem as the Draft EISs and should be incorporated or referenced in the EIS.*

*On the state level, respondents mention Oregon Governor Kitzhaber's 11-point timber plan and Washington's Growth Management Plan. Some respondents point to state programs such as the Forest Practices Act, Cumulative Watershed Effects Assessment Process, the Beneficial Use Reconnaissance Project, and the Governor's Bull Trout Recovery Plan, which are in place and have been found effective through on-the-ground audits.*

*Others assert that local plans, such as at the county level, are the best way to manage local areas, and that federal programs should conform to those plans. At least one respondent feels that the Draft EISs do not adequately evaluate county and community land use plans, economic development plans, zoning plans, and other resource related plans. Some feel that county land-use plans and plans such as the Wallowa County Nez Perce Tribe Salmon Habitat Recovery Plan must not be superseded by the selected alternative.*

**Response:** Nothing in the EIS management direction would change the management of state, private, or tribal lands. Some federal laws contain provisions for state administration of specific environmental programs or for making state laws applicable to federal lands and facilities. State and local laws relating to the health, safety, and welfare of people apply to activities on federal lands so long as the activities are also consistent with federal laws and regulations. The Record of Decision will not preclude compliance or commit the agencies to actions that would violate such legal requirements.

The authority of the Forest Service regional foresters and BLM state directors extends only to the administration of the national forests or BLM districts within their jurisdiction. The decision to be made and documented in the Record of Decision will not supersede plans developed outside the agencies' authority. Many county plans have been reviewed. The project has had involvement from county commissioners within the project area on the development of the Draft EISs and Supplemental Draft EIS.

**Comment:** The project should revisit and improve consistency review efforts.

**Narrative:** *Respondents noted that with 104 counties and 476 communities in the project area, a sampling of 32 county and community plans is not sufficient to be in compliance with 43 CFR 1610.3-2 and 30 CFR 1502.16. These regulations require a discussion of possible conflicts between the proposed action and the objectives of federal, tribal, regional, state, and local land use plans, policies, and controls for areas concerned. It is noted that reference is made in the Draft EISs of the County/Community Vision Statement Project (August 1995), but the report is not included as an appendix and is not discussed fully as it should be in the Draft EISs.*

**Response:** Many county plans have been reviewed and the project has had involvement from county commissioners within the project area on the development of the Draft EISs and Supplemental Draft EIS. The Final EIS will be sent to the respective states' Governors to undertake a Governor's Consistency



Review as is required by the BLM planning process. The project will ensure that it is in compliance with federal, state, tribal, and local laws, to the extent possible, prior to issuing a final decision. The report referenced above can be found in the EIS administrative records, and is available upon request to anyone who would like to see how conclusions were determined during the analysis process.

**Comment:** The EIS should address and incorporate into the selected alternative the Standards for Rangeland Health and Guidelines for Livestock Grazing Management.

**Narrative:** Several respondents state that since the Standards for Rangeland Health and Guidelines for Livestock Grazing Management, known as the Healthy Rangeland Initiative, were issued after the Draft EISs were released, these Standards and Guidelines should be incorporated on a local level. Others, however, believe that some inconsistencies between the Rangeland Reform effort and the Draft EIS need to be resolved before the Record of Decision is issued. They strongly recommend that the selected alternative provide direction to restore rangeland conditions.

**Response:** The alternatives analyzed in the Supplemental Draft EIS include management direction intended to complement or support the Healthy Rangelands Initiative. The rangeland standards and guidelines were developed by the BLM state directors of Oregon/Washington, Idaho, and Montana, in consultation with the affected Resource Advisory Councils (RACs) and Provincial Advisory Committees (PACs). They were approved by the Secretary of the Interior in August 1997 and are being implemented. Healthy Rangelands standards and guidelines are presented in Appendix 13 of the Supplemental Draft EIS.

## Effects on Other Public Lands and Private Lands

**Comment:** The EIS should address adverse effects on the rights of private property owners and private citizens, including the effects of the Endangered Species Act on private lands and the increased pressure on private lands from restrictions on ranching on public lands.

**Narrative:** The effects of the Draft EISs on private property cause great concern among the majority of respondents who discuss this subject. Many fear that the project's vast scope and philosophy of ecosystem manage-

ment cannot help but negatively affect private property values and the rights of property owners. They feel that the Draft EISs only hint at the effects on private lands, and many people view this with suspicion and anger.

Many fear that public use and resource production on public land will be curtailed by the selected alternative and will increase stresses on private lands, resulting in degradation of those lands and increased commodity prices. Some respondents are concerned that restrictions on public lands will increase the pressure on private lands. They feel that the EIS should address this issue. Others feel there will be no effects on private property.

Many believe that increased restrictions on private lands, which many feel will inevitably arise if the preferred alternative is implemented, will lower land values and amount to an illegal taking, in violation of the Fifth Amendment of the U.S. Constitution. Others believe that the Draft EISs do not include a Takings Implications Assessment as required by executive order and do not include such analysis of impacts on rural counties or provide provisions for flexibility for rural counties as required by congressional mandate.

**Response:** Decisions made through this EIS will provide direction only for public lands administered by the Forest Service or BLM in the project area and would make no management decisions for and would not impose regulations on state, local, tribal, or private lands. These decisions are not intended to affect rights, privileges, regulations, policies, or provisions made by state, or local agencies, tribal governments, or private landowners.

However, how Forest Service- and BLM-administered lands are managed could either positively or adversely affect other lands just as current management of federal lands affects other land and private land management affects federally administered lands. In other words, when an action takes place on federal land, it may cause direct, indirect, or cumulative effects on non-federal lands. For example, a wildfire that begins on federal land may burn to adjacent private land; and noxious weed infestations that began on private land may infest adjacent federal lands. Through the direction in this EIS, adjacent landowners may benefit indirectly from better controls on noxious weeds and less severe forest fires.

The National Environmental Policy Act (NEPA) requires that federal land managers look at both how they might affect surrounding lands as well as how management on those lands might affect federal lands. Because of the broad-scale nature of the EIS, the potential effects of ongoing and foreseeable activities on non-federal lands was considered as a part of the cumulative effects analysis conducted by



the Science Team. Chapter 4 outlines the possible cumulative effects on all lands.

**Comment:** The EIS should consider its consequences on other public lands.

**Narrative:** *Some state that the project is unclear or silent regarding its effect on the numerous public lands other than those administered by the Forest Service and BLM. One respondent expressed concern that no apparent consideration was given to the effects of the proposed actions on National Park Service lands, including Crater Lake National Park. They feel that in general the actions proposed in the alternatives are too broadly described and that specific implementation plans are still lacking. They believe that it is therefore difficult to ascertain the likely effects on National Park Service lands, and that future opportunities for input are desired as specific implementation plans are developed. They believe the section titled Cumulative Effects on Federal Lands in Chapter 4 of the Draft EISs is misnamed, since it discusses effects only on Forest Service- and BLM-administered lands. They feel that cumulative effects analysis is needed on the National Park System and other federally administered lands.*

**Response:** Management direction for other federally administered lands are the responsibility of the respective federal agencies. The *SAG Analysis of Effects* is presented for both Forest Service- and BLM-administered lands and for all lands, including lands administered by other federal agencies, to provide an insight into potential cumulative effects. These effects are disclosed in Chapter 4 of the Supplemental Draft EIS.

**Comment:** The EIS should clarify coordination efforts and planning considerations with regard to cumulative effects of tribal plans.

**Narrative:** *Respondents note that the "Other Planning Efforts" subsection of Chapter 1 of the Draft EISs states that tribal plans were considered in analyzing cumulative effects. But the Yakama Nation feels there was not serious consideration of the Salmon Recovery Plan adopted by the Yakama Nation. They ask for an explanation of this contradiction; they feel that the EIS should be more specific about the amount of consideration given tribal plans, and the conclusions or assessments made after their consideration.*

*Some respondents suggest that a Memorandum of Understanding be written to establish a true partnership between the local governments and federal agencies. In addition they suggest that provisions similar to T1-O1, T1-S1, and T1-S2 be incorporated relative to the relationship between the federal agencies and the counties.*

*Respondents think that the overall goals of Draft EIS are generally consistent with the Wallowa County Nez Perce Tribe Salmon Habitat Recovery Plan, but that the specific objectives and standards throughout the Draft EISs make it incompatible with their local plan.*

**Response:** During the planning process the EIS Team considered the consistency of the preferred alternative with local planning efforts. This involved the collection and review of many county land use, economic development, and other plans. Extensive efforts were made to coordinate with tribes and to consider tribal rights, interests, and plans. Early in the project, the ICBEMP Tribal Liaison Group contacted 22 tribal governments, representing numerous tribes that reside within or have rights and interests in the ICBEMP project area. The purpose of the contact was to help develop, based on a government-to-government relationship, a consultation process with each tribal government and to work closely and continuously with each other to integrate tribal rights and interests in the planning process. All the tribal governments participated to varying degrees and at various times. Five tribal summit meetings were scheduled for government-to-government consultation with the 22 tribal governments; and three summits were held with representatives of the eight tribal governments that chose to participate. A Tribal/Executive Steering Committee Working Group was formed as a result of a meeting between the Secretary of the Interior, federal representatives, and representatives of 10 of the 22 affected tribal governments. The Working Group's charge was to identify and work toward mutual resolution of tribally identified basin-wide issues. Coordination and planning efforts with the tribes are discussed in detail in Chapter 1; effects of the alternatives on tribal rights and interests are disclosed in Chapter 4.

**Comment:** The EIS should describe its effects on and address the protection of National Historic Landmarks and National Natural Landmarks on lands affected by management actions in the EIS.

**Narrative:** *Respondents did not see any attention given to the effects of this plan on National Historic Landmarks (NHLs) or National Natural Landmarks (NNLs). They point out that there are six designated NHLs and 18 designated NNLs within the planning area managed by the Forest Service, BLM, National Park Service, U.S. Fish and Wildlife Service, Corps of Engineers, Washington State Parks, Oregon State Parks, Washington Department of Natural Resources, Washington Department of Fish and Wildlife, Whitman County, the Nature Conservancy and private landowners. These respondents feel that it is*



*important that the EIS address protection of natural and cultural resources of these sites.*

**Response:** Many decisions are not appropriately made at the broad-scale of this EIS. Analysis of issues pertaining to specific national historic landmarks requires more site-specific condition information and data than what was collected or relied upon for analysis of effects in this EIS. The protection of specific national historic landmarks managed by the Forest Service and BLM are addressed in specific Forest Service or BLM management or project plans.

**Comment:** The EIS should disclose the effects of land exchanges, both current and planned.

**Narrative:** *Some respondents feel that the National Environmental Policy Act is being violated because the Draft EISs do not address the effects of pending land exchanges. They think the EIS should analyze and disclose the impacts of potential habitat loss and the cumulative effects of other new ownerships with regard to unanticipated management activities, such as resource extraction and development.*

**Response:** Analysis of issues pertaining to the effects of land exchanges requires more site-specific condition information and data than what was collected or relied upon for analysis of effects in this EIS. The ownership data layers came from existing maps, which were last updated in 1995. The data layers were created for broad-scale modeling, analysis, and reporting for the project. The data layers on ownership will be updated to reflect more up-to-date ownership information during implementation and monitoring.

Land exchanges for the Forest Service and BLM occur occasionally within the interior Columbia River Basin. The potential effects of those exchanges are evaluated and disclosed by the appropriate Forest Service or BLM manager.

## Implementation

### Priorities

**Comment:** Vague and conflicting direction and the abundance of standards in the EIS create uncertainty and confusion for decision makers and the public, leading to costly delays and difficulties in implementation.

**Narrative:** *Some respondents feel the preferred alternative in the Draft EIS imposes hundreds of new management standards on land managers, many of which are vague and conflicting. They feel that this creates an atmosphere of uncertainty and confusion for managers and the public alike, leading to excessive and costly delays in decision-making. According to these people, the ambiguous wording in the alternatives will impede implementation of the EIS. For example, it is suggested that the premise for Alternative 4 is inconsistent and sets up a conflict: vegetation management is designed to maintain or restore ecosystem processes; at the same time vegetation management is supposed to reduce risks to property, products, and economic and social opportunities. Where such purposes come into conflict, respondents ask which will have priority. Some people feel that the abundance of aquatic standards in the Draft EISs will make implementation difficult.*

**Response:** The design of the overall strategy for the project has been refined based on public, agency, and science input on the Draft EISs, new scientific information, and discussions with tribal and interagency partners. This refined focus was emphasized in a letter from the Secretaries of Agriculture and the Interior (October 8, 1998) to members of the Congress. This letter put emphasis on a new approach for management direction to address a limited number of issues to be resolved at the basin level, while allowing flexibility for other issues to be dealt with at finer scale or local levels. A result of this refinement, fewer standards and objectives are included in the revised alternatives as described in Chapter 3.

The Supplemental Draft EIS attempts to improve clarity, focus, and implementability of the proposed management direction. A hierarchy of direction, as described in Chapter 3, was developed to resolve conflicts in direction. The step-down process was clarified to minimize delays and difficulties in implementation.

**Comment:** The EIS should discuss how the project will gain local and congressional support for implementation.

**Narrative:** *How the project will be implemented is a growing concern for many people, who feel the Draft EISs do not address this issue. They feel that a plan should be developed for gaining acceptance from Congress of implementing the EIS. They worry that promotion of ill-conceived management plans by senators and representatives mean that any rational and well-thought-out plan has little chance of acceptance.*



*Others note that federal land management agencies have been dealing with low levels of public trust in land management for the past several years. They suggest that the EIS should thoroughly discuss the importance of building public trust in the interior Columbia River Basin to achieve implementation. They point to Governor Kitzhaber's 11-point forest health strategy, which asks for delays in treatments in controversial areas, old-growth, and sensitive riparian areas; they feel that after the agencies have built a record of success in other areas, they can move forward in more controversial areas with a higher level of public support.*

**Response:** The project has maintained an open dialogue with members of the congressional delegations from the states within the project area, to ensure they are aware of the status and content of the Supplemental Draft EIS. This includes projected implementation costs and the effects on the lands administered by the Forest Service and BLM if the project were funded at lower levels than necessary to meet the goals and objectives of the project. While preliminary in nature, it gives congressional members, as well as the general public, an idea of how the plan will be implemented.

**Comment:** The EIS should establish a schedule (where, when) for implementing at the local level.

**Narrative:** *Where to begin, some feel, is a big question that is not addressed in the Draft EISs. They believe the EIS should set a schedule for conducting projects in local areas so the communities will know what is occurring. Some feel that the EIS should not be implemented until a Record of Decision has been signed. Some ask what will be done to maintain the objectives once the selective alternative has been implemented.*

**Response:** Chapter 3 of the Supplemental Draft EIS has been revised to include:

- ♦ step-down process showing what analysis is needed (mid-scale analysis [Subbasin Review], Ecosystem Analysis at the Watershed Scale [EAWS], or site-specific NEPA analysis) and links among decision levels;
- ♦ a monitoring plan linked to step-down (see Appendix 10);
- ♦ increased focus on interagency and intergovernmental collaboration;
- ♦ a budget strategy showing funding assumptions.

Implementation of land use plan decisions analyzed in the EIS alternatives will not begin until a Record of Decision is signed.

**Comment:** Methods used to implement the selected alternative should be ecologically sound.

**Response:** The Executive Steering Committee and project staff are committed to ensuring that the selected alternative will be implemented in an ecologically sound manner, thereby meeting the purpose and need for the project and allowing for the best management of Forest Service- and BLM-administered lands in the long term.

**Comment:** Implementation of ecosystem management principles should be applied first to a smaller test area; upon successful implementation, the concepts of ecosystem-based management could be applied to the remainder of the project area.

**Narrative:** *Some respondents suggest that implementing ecosystem management principles on a smaller scale would allow problems to be identified and resolved on a limited, more manageable scale before applying the strategy to an area the size of the interior Columbia River Basin. They feel that considering a demonstration pilot project on selected areas would be useful since there is no history of implementing a plan covering 72 million acres.*

**Response:** Much of the existing, effective direction in current BLM and Forest Service land use plans will continue when the Record of Decision (ROD) for this project is signed. Broad-scale management direction in the ROD will augment, and in some cases replace, the direction in the land use plans. The step-down process has been refined in the Supplemental Draft EIS to more clearly explain its intent to provide a process for stepping the broad-scale decisions and science findings down to site-specific areas using a methodical hierarchical approach. This should provide a smooth transition for implementing the ROD; therefore, a demonstration pilot project on selected areas would not be necessary.

## Funding

**Comment:** Project planning and implementation costs far outweigh potential benefits, and the project should be stopped.



**Narrative:** *Many respondents to this topic don't want any more money allocated for the project. They believe too much money has been spent, with what they perceive have been too few tangible results. Many respondents want local land managers to be given "what can be salvaged" but do not want to "waste" an additional \$120 million per year on implementation.*

**Response:** The estimated costs for implementing the alternatives in the Supplemental Draft EIS are reduced from those in the Draft EISs. Implementation costs are discussed in detail in Chapter 4 of the Supplemental Draft EIS, which includes four tables of implementation costs and estimated outputs based on several different funding levels.

**Comment:** The EIS should identify how to fund implementation, as well as how to fund and implement at lower levels if full funding is not received.

**Narrative:** *Many want to know where the money will come from to implement the project. Some believe that restoration should be charged to those who caused the damage, such as logging companies, and should not come from taxpayers pockets. Others believe that funding should come from the Congress, not from timber sales. Some assert that some funding should come from timber receipts, but they doubt with the call for harvest cutbacks in the Draft EISs, enough money will be available. They wonder if the project has a back-up plan if funding is not available.*

*Some feel that sufficient funding will not be available to carry out all provisions of the selected alternative, including Subbasin Reviews and Ecosystem Analysis at the Watershed Scale. They feel that the first priority for management activity levels, if and when funding becomes limited, should be to strive to meet all ecosystem objectives and remove interim management standards.*

*Some believe that the Congress will not approve such a large funding request, because these respondents plan to voice their opposition to their representatives.*

**Response:** The Supplemental Draft EIS displays the projected program costs of implementing the decisions in the amended land use plans for both Forest Service and the BLM. As with all land use plans, the Congress will ultimately decide what funding is made available to implement the actions called for in the Record of Decision.

An important component of implementation will be the monitoring necessary to assure that the project

meets the intention of the restoration actions. Built into the funding made available by the Congress to achieve various restoration actions will be the necessary actions called for such as analysis, Subbasin Review, monitoring, collaboration, and in some cases research. The management strategies called for in the management direction are intended to support an ecosystem management approach rather than an individual project-by-project basis.

**Comment:** Implementation costs to the government need to be displayed in the EIS.

**Narrative:** *Some argue that the Draft EISs do not contain a full cost accounting of implementing the project's direction, which they believe is "critical to assessing which alternative is best for taxpayers." Others point out that reduced production, reduced agency revenues, and increased subsidies represent an "irresponsible" strategy. Specifically, a few want to know how local logging operations are to afford the new equipment required with the alternatives.*

**Response:** The Supplemental Draft EIS displays and describes the programmatic costs of implementation of the alternatives (Chapter 4), assuming various levels of funding, including an assumption of no additional funding. The Supplemental Draft EIS also describes the effects of the alternatives on the economies of communities within the project area, including how the alternatives may affect agency revenues and receipts to local governments. It is difficult for a land use plan to estimate all of the individual decisions that private business may make to adjust to changing economic circumstances.

## Collaboration

**Comment:** Interagency and intergovernmental collaboration should be thoroughly addressed in the EIS implementation plan.

**Narrative:** *Some respondents believe that working with the Forest Service and BLM will be neither beneficial nor productive. They feel many federal agencies cannot work together and the project will fall apart. Other respondents suggest that objective EM-O2 (implementing the plan using intergovernmental collaboration) should clearly define which entities will be involved in which processes at what level; they feel that a standard should state that the best, most recent scientific information will guide analysis and management. Still others feel that the interagency,*



*intergovernmental collaborative approach does provide for early involvement, which could increase efficiency and credibility of the products of all agencies.*

**Response:** The standards and objectives brought forward from the Draft EIS have been revised and rewritten to improve clarity and understanding. Collaboration and coordination are a key feature in numerous objectives and standards which spell out the kinds of collaboration intended to be undertaken in such areas as noxious weed control, roads management, water quality protection, social and economic matters, tribal concerns and issues, and other areas. Specific objectives with corresponding standards call for collaboration and increased intergovernmental coordination in planning, implementation, monitoring, and technology transfer. Chapter 3 now includes an increased focus on interagency and inter-governmental collaboration. The *Subbasin Review Guide* also outlines collaboration requirements for Subbasin Review.

**Comment:** The EIS should address who will be responsible and accountable for its implementation, monitoring, and outputs of goods and services.

**Narrative:** *Many feel that the Draft EISs do not establish who will be responsible for implementing the Record of Decision. They want each alternative to list how the activities will be monitored and by whom, including responsibility for determining when ecosystem health is reached. Some feel that monitoring of plan implementation should not be left exclusively to the Forest Service and BLM field units; rather, they feel, the Forest Service regional and BLM state offices should have oversight of compliance and effectiveness. Some feel that one approach for increased accountability is to reflect specialists' input in the form of contract clauses.*

*Some respondents think that a lack of accountability is a possible violation of the Endangered Species Act because it does not address foreseeable actions on a site-by-site basis. Some say that the Draft EISs look at accountability only as meaning how well the different agencies collaborate, ignoring how actual production of goods and services will be monitored. They believe that if the agencies do not produce any commodities, then no accountability objective or standard will have been violated.*

**Response:** At the local level forest supervisors and district managers will have the responsibility for implementing and monitoring the decisions

documented in a Record of Decision. In order to coordinate the implementation of the selected alternative across federal agencies and administrative unit boundaries, the agencies' organizational structure would need to include a mechanism for basin-wide coordination and subregional interagency coordinating committees. The Executive Steering Committee, established to guide the project, would function on an *ad hoc* basis to resolve basin-wide issues. More specific guidance will be developed for the Record of Decision.

An estimation of effects on the levels of goods and services can be found in Chapter 4 of the Supplemental Draft EIS.

## Implementability

**Comment:** A framework for developing cumulative effects at multiple levels has been omitted in the Draft EIS, Appendix 3-1/I. Credible cumulative effects analysis and procedures need to be conducted and described to reveal impacts of decisions, at the broad scale of this project and at subsequent finer scales.

**Response:** The National Environmental Policy Act regulations require consideration of direct, indirect, and cumulative impacts. A "cumulative impact" is defined as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency or person undertakes such other actions (40 CFR 1508.7). A cumulative effects analysis of the three new alternatives is incorporated into the discussion of effects in Chapter 4 of the Supplemental Draft EIS. For this EIS, potential cumulative effects include those that were assessed for all land ownerships, including lands administered by other federal agencies and non-federal lands.

**Comment:** The meaning and intent of standard A-S4 are unclear about whether measurable standards are to be implemented before ecosystem analysis or NEPA analysis.

**Response:** Standard A-S4 "Implement accountable, measurable standards" has not been carried forward to the Supplemental Draft EIS. Standards that were brought forward have been revised to improve clarity



and understanding so that they are more enforceable. Accountability of Forest Service and BLM managers will be addressed in the Record of Decision.

**Comment:** Language should be included in objective AM-O2 to ensure that monitoring decisions occur locally, and that professionals will collect monitoring data. Measures to be included in annual monitoring should be clarified.

**Narrative:** *Some respondents feel that monitoring is a great idea and that the most knowledgeable people should complete it. They feel that local management and decision-making in monitoring is critical. Others feel that a range of conditions, not a singular state, must be set as a monitoring target; this range of conditions and goals will require continuous monitoring and adaptation to new information. Some want more emphasis on effective monitoring to provide reliable feedback for adjusting management, focusing more on 5- to 10-year goals and impacts.*

*Some feel that standard AM-S4 should be removed, along with other standards that "cause unnecessary implementation delays and analysis." Others feel that the Draft EISs ignored the changing nature of our knowledge of environment and the need to adapt management through monitoring, by "requiring specific monitoring actions that may not be required to reach the goal."*

**Response:** Monitoring and evaluation are an integral part of adaptive management and are key to achieving the short- and long-term goals and objectives of the project. The wide diversity and variability of biophysical resources and socio-economic conditions within the project area require that management direction be outcome-based rather than prescriptive. Success in meeting project goals and objectives requires that the effects of this outcome-based direction be monitored and evaluated in a timely manner with the appropriate people to determine if modifications are needed. The monitoring and evaluation framework is described in Appendix 10.

**Comment:** Standard AM-S7 requires Forest Service districts and BLM resource areas to modify actions if the objectives are not being met; however, it suggests that EIS objectives can be modified if they do not work. The intent of this standard and the procedures for modifying objectives should be clarified to explain how observations at the district or resource area level can be used to change an objective that applies to the entire project area.

**Response:** Standard AM-S7 pertaining to monitoring objectives has not been carried forward to the Supplemental Draft EIS.

**Comment:** Although there is flexibility to change standards at the local level, the process may be neither practical nor feasible.

**Narrative:** *Many questions remain about how decisions in the EIS will be translated to decisions on the ground. Some feel that when faced with a specific land management decision, local land managers will be bound to the EIS, even if goals are contradictory or make little sense. They worry that land managers must somehow balance problems such as reducing fire fuels vs. the need for downed wood, fire risks vs. impacts of harvest on aquatic resources, or watershed restoration vs. recreational opportunities. Respondents believe that local land managers will be "straddled with hundreds of new standards, the impossible task of proving the science wrong, or justifying any course of action." They feel that the ultimate result will be uncertainty, and costly delays. Many suggest that standards be more flexible and serve only as scientifically sound guidelines for local managers.*

*Some respondents perceive that implementing the selected alternative at the regional level will invalidate their local or cultural integrity (which they see as the ability of community members to make land management decisions at a local level). They feel it is unfair for anyone outside their community to make decisions that could affect the integrity of their culture and lifestyle. A few people suggest that the project needs to integrate the lifestyles of resource-based communities into the documents to adequately consider the outcomes of future decisions, and that policies must work to reduce the stress resulting from changes to their lifestyles.*

**Response:** The revised strategies in the Supplemental Draft EIS include a more detailed description of how local Forest Service and BLM managers and their staffs can take the broad-scale information and management direction and "step it down" to mid and fine scales. The step-down processes allow local managers to consider site-specific conditions when designing activities to meet broad-scale expected outcomes. Implementation procedures are further discussed in Appendix 10 and the Subbasin Review Guide, currently in draft form and subject to further refinement.



# Relationship to Laws

## Specific Laws

**Comment:** The selected alternative in the EIS should comply with the American Folklife Preservation Act.

**Narrative:** *In 1976, the U.S. Congress passed the American Folklife Preservation Act (P.L. 94-201). This Act defines folklife as a way of life for various groups in the United States that share traditional expressive culture. Some respondents feel the project seeks to ignore this culture that has been defined over two centuries, usually by oral means. They feel that this culture is no more or less significant than any other culture present in America.*

**Response:** The American Folklife Preservation Act established an American Folklife Center in the Library of Congress and authorized the Center to develop and implement programs of research and training, and performances and exhibits; to maintain a national archive and to procure and collect creative works, artifacts and other records related to American folklife. The actions outlined in the Supplemental Draft EIS will have no bearing on this Act.

Chapter 3 of the Supplemental Draft EIS includes a section titled *Support Economic and Social Needs of Communities and Cultures*. The objectives and standards are designed to promote agency support for, and collaboration with, local and tribal communities when developing methods to support their social and economic needs. The intent is to integrate the needs of local and tribal communities more thoroughly into agency decision-making and management activities. Methods may range from targeting contracts for the local workforce to a greater coordination and streamlining of agency planning efforts.

**Comment:** The selected alternative should comply with the Regulatory Flexibility Act and the Small Business Regulatory Enforcement Act.

**Narrative:** *Some people believe that the Forest Service and BLM violated the Regulatory Flexibility Act (RFA), also referred to as the Small Business Regulatory Enforcement Act. They believe that the RFA applies because the EIS can be considered a rule that sets standards. They note that Congress passed the RFA in 1980 after learning that*

*uniform federal regulations produced a disproportionate adverse economic hardship on small entities.*

**Response:** The respondents were apparently drawing a parallel between the planning process the project is engaged in pursuant to National Environmental Policy Act, and rulemaking. The Forest Service and BLM are not engaged in rulemaking through this EIS. The project is not drafting regulations for purposes of these acts, and the requirements of the Regulatory Flexibility Act do not apply.

**Comment:** The selected alternative should comply with Presidential Executive Order 12866 – Regulatory Planning and Review.

**Narrative:** *Respondents ask whether each of the federal requirements listed has been addressed with all local governments in the area, citing Presidential Executive Order 12866-Regulatory Planning and Review and the National Environmental Policy Act (NEPA).*

**Response:** The Forest Service and BLM are not publishing regulations that would impose regulatory requirements that might affect other governmental entities in this EIS. The commenters were apparently drawing a parallel between the planning process the project is engaged in pursuant to NEPA, and rulemaking. The Forest Service and BLM are not engaged in rulemaking through this EIS.

**Comment:** The selected alternative should comply with Revised Statute RS-2477.

**Narrative:** *Some people state that statutory authority exists for the right to access in connection with natural resource development, transportation, energy transmission, and water, and for roads and easements existing before 1976 that were created by RS 2477 and other legislation. They fear potential loss or restriction of existing or future access to private or state lands that border or are intermingled with Forest Service- or BLM-administered lands, and they fear potential loss of access to traditionally used access routes, many of which they claim cannot be closed because the routes are public rights-of-way covered under RS 2477. These respondents feel that the Draft EISs do not adequately address the legal implications of these land use restrictions on both private and public lands.*

**Response:** Section 2477 of the Revised Statutes of 1878 (43 U.S.C. 932) authorized rights-of-way for construction of highways over public lands not



reserved for public uses. Section 706(a) of Public Law 94-579 repealed the existing law effective October 21, 1976. However, valid and existing rights, including rights of ingress and egress, existing on October 21, 1976, were not invalidated. In 1996, the Omnibus Appropriations of 1997 Act (Public Law 104-208) provided that "No final rule or regulation of any agency of the federal government pertaining to the recognition, management, or validity of a right-of-way pursuant to Revised Statute 2477 shall take effect unless expressly authorized by an Act of Congress subsequent to the date of enactment of this Act, September 30, 1996."

Roads management objectives and standards in the EIS are intended to progress toward a smaller transportation system that can be maintained into the future with minimal environmental impact. The direction intends for the use of a staged approach that concentrates short-term efforts on reducing road-related adverse effects, while determining the long-term road system needs and locations in a manner that maintains choices for future generations. The biggest change to the existing road system is expected in areas that are highly roaded and have high road-related risks to resource values, where action has not already been taken to address the problem. It is not expected that any valid and existing rights to road access will be affected by the decisions made in this EIS.

**Comment:** The Draft EISs do not comply with the spirit and intent of NEPA because the preferred alternative does not sufficiently consider the economic impact on small rural communities.

**Response:** The *Economic and Social Conditions of Communities* (1998) report included a social and economic characterization of 543 communities in the project area, identified geographically isolated (rural) towns, and identified various community categories to describe and compare towns; it further assessed the possible impacts of implementing the Draft EIS alternatives on categories of communities and discussed cumulative economic and social impacts. Chapter 4 in the Supplemental Draft EIS further discusses the effects of the three alternatives on small rural communities in the project area.

**Comment:** The Draft EISs do not comply with NEPA for many perceived procedural violations,

which in turn may encompass compliance questions within the Administrative Procedures Act.

**Narrative:** *Alleged NEPA violations include: "bad science and analysis" leading to inadequate cumulative effects models; missing information that should be disclosed for comment; connected actions not taken into account; purpose and need not met by alternatives (see also Purpose and Need); range of alternatives not large enough to fulfill public needs (see also Range of Alternatives); and environmental effects not disclosed because the EIS is too vague to begin with.*

**Response:** The Science Team and the EIS Team examined a substantial amount of credible information about the topics addressed in the Draft EISs to estimate the effects of those alternatives. Alternative development and analysis complies with current laws and regulations. The Science Team documented their analysis of the EIS alternatives in *Evaluation of EIS Alternatives by the Science Integration Team* (Quigley, Lee, and Arbelbide 1997) and *Science Advisory Group Effects Analysis for the SDEIS Alternatives* (Quigley 1999). NEPA requires that environmental analysis be based on "reasonably foreseeable" future actions. The EIS Team incorporated the Science Team's analysis and disclosed the environmental effects in Chapter 4 (Environmental Consequences).

A refinement to the design of the overall strategy for the project was initiated based on public, agency, and input from the Science Team on the Draft EISs, new scientific information, and discussions with tribal and interagency partners. This new approach is presented in the Supplemental Draft EIS and was evaluated by the Science Advisory Group in a manner similar to that used for the Draft EISs.

Alternative S2 was identified as the preferred alternative in part because it best addressed the Purpose and Need. The range of alternatives includes both the seven alternatives in the Draft EIS and the three alternatives in the Supplemental Draft EIS.

**Comment:** The Draft EISs do not comply with the National Forest Management Act (NFMA) or the Federal Land Policy and Management Act (FLPMA) because of procedural violations such as not having one lead agency to standardize a decision or use one regulatory implementation process and because of lack of protection for sensitive species and habitats on the edge of being listed.



**Narrative:** *Some feel that by not falling completely under the Forest Service or the BLM, the process has been circumvented, leaving decision makers the ability to decide anything without abiding by one set of rules alone. Some say that NFMA is violated because the preferred alternative does not provide sufficient protection for sensitive species and habitats that are close to being listed under the Endangered Species Act.*

**Response:** The agencies have the discretion to manage public lands pursuant to the NFMA and FLPMA. In 1994, both the Forest Service and BLM felt that the need to prepare a regional assessment and analysis of lands within the interior Columbia River basin could be coordinated. Under the NEPA, federal agencies "may act as joint lead agencies to prepare an environmental impact statement (40 CFR 1501.5(b))." Subsequent land management planning and analysis will be accomplished during the amendment or revision processes of the Forest Service or BLM land use plans.

The risks and opportunities associated with conservation of rare plant communities and habitat for plant, animal, and fish species of concern in the interior Columbia River Basin was addressed to the degree appropriate at the broad-scale in the Draft EISs and the Supplemental Draft EIS, and they will be further addressed through the appropriate step-down processes (programmatic planning processes, Subbasin Review, EAWS, or site-specific NEPA analysis). (See Appendix 6 for the list of species.)

Species listed under the ESA or classified as Sensitive Species through Forest Service or BLM processes will continue to be addressed through established agency policy.

**Comment:** The Draft EISs do not comply with National Forest Management Act (NFMA) because TS-O6 states that timber production is a by-product of restoration activities. NFMA land classifications were changed to meet the Riparian Conservation Area requirements and are clearly outside the law. By not analyzing the effects on allowable sale quantities, the Draft EISs also fail to comply with NFMA.

**Response:** The Supplemental Draft EIS includes a standard that states "During land use plan revision, RCAs [riparian conservation areas] shall not be included in the suitable timber base used to calculate the allowable sale quantity." The NFMA implementing regulations (36 CFR 219.14) describes timber

resource land suitability. The regulations indicate that the identification of lands not appropriate for timber production is based on a consideration of multiple-use objectives. In this case, the concern for aquatic habitat and watershed condition, and the objectives associated with improving riparian areas, precludes including the RCAs as part of the suitable timber base for purposes of determining the allowable sale quantity.

It is appropriate for each national forest to analyze their Allowable timber Sale Quantity (ASQ). Forest Plans set an ASQ for the administrative unit. The ASQ will be reanalyzed by the individual Forests at the time they prepare land use plan amendments or revisions.

**Comment:** The Draft EISs do not comply with National Forest Management Act (NFMA) or Federal Land Policy and Management Act (FLPMA) because of procedural violations such as not integrating decision-making processes regarding the additional layers of analysis (including Subbasin Review and Ecosystem Analysis at the Watershed Scale [EAWS]) that would establish new regional direction initiating land management amendments. The Draft EISs do not specify the extent of further National Environmental Policy Act (NEPA) and other planning processes regarding significant amendments resulting from this project. Regional Guides, Forest Plans and Resource Management Plans will all be affected.

**Response:** The use of an ecosystem management approach to achieve ecological integrity is compatible and in compliance with the mandates of the NFMA and FLPMA. The *Scientific Assessment* and planning process was necessary for the Forest Service and BLM to adjust to changing needs and conditions, as the law requires, and to resolve management issues across the interior Columbia River basin.

The revised strategies in the Supplemental Draft EIS include a more detailed description of how local Forest Service and BLM managers and their staffs can take the broad-scale information and management direction, and "step it down" to mid- and fine scales. The step-down processes allow local managers to consider site-specific conditions when designing activities to meet broad-scale expected outcomes.

Step-down processes may include programmatic planning processes, Subbasin Review, EAWS, or site-specific NEPA analysis. These are described in more detail in Chapter 3.



**Comment:** The Draft EISs do not comply with the Forest and Rangeland Renewable Resource Planning Act (RPA).

**Narrative:** *Respondents ask how the RPA program is incorporated into the project, and they cite violation of the National Forests Management Act (NFMA) by not identifying an RPA alternative as regulated. Reasoning comes from the idea that if the project will be automatically amending portions of forest plans then it must follow the planning regulations. One respondent believes the project should be stopped until the 1995 RPA Program is signed, since the RPA provides program guidance for the Forest Service which might be contradictory to the project, such as changing from multiple-use to ecosystem management.*

**Response:** The authority for the Forest Service to prepare this EIS is found in the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (16 USC 1601-1614); and the implementing regulations of NFMA (36 CFR Part 219). The NFMA provides guidance on the development, maintenance, and revision processes for forest plans, and does not require the EIS to identify an "RPA alternative."

This EIS is programmatic, recognizing that later NEPA documents will be required to disclose site-specific environmental and cumulative effects. In this case, the EIS will provide a broad framework for management of National Forests and BLM Districts within the interior Columbia River Basin.

In 1995, the Forest Service issued a draft strategic plan to meet the requirement of the RPA, and presented a broad approach to guidance for national and international Forest Service programs. It has not been finalized.

**Comment:** The Draft EISs do not comply with the Americans with Disabilities Act because of a lack of emphasis on access for recreation.

**Narrative:** *Respondents feel that there is not enough emphasis on access and recreation, and that when recreation is even mentioned it is in the form of monitoring it for ecological reasons, not to ensure the recreational experience. Some worry this is a forecast for fewer and fewer opportunities, especially people with disabilities with limited access.*

**Response:** The Draft EISs do not propose site-specific changes to road use or recreation access. The detail needed to assess access to specific recreation sites requires fine-scale analysis, and was not considered in

the Draft EISs. The Americans with Disabilities Act of 1990 will continue to be addressed and complied with in plans at national forest and BLM district levels, as appropriate, where decisions regarding recreational use are made.

**Comment:** The Draft EISs do not comply with the Clean Water Act.

**Narrative:** *Clean water is a concern for many who do not believe the project will have strong enough standards and objectives to enforce compliance with the Clean Water Act. The majority of comments referencing this Act express worry that there is too much compromise for active management, not enough protection of aquatic habitat, and not enough coordination with the states regarding existing management plans and regulations such as Best Management Practices.*

**Response:** A monitoring program and the adaptive management process will help ensure that water quality protection measures are meeting water quality and aquatic habitat objectives. The monitoring and adaptive management framework is presented in Appendix 10.

The intent is for coordination to occur with the states and other non-federal landowners during Ecosystem Analysis at the Watershed Scale. Cooperation with non-federal landowners has the potential to benefit water quality on both federal and non-federal lands and could reduce the potential need for developing total maximum daily loads under the Clean Water Act. Total Maximum Daily Loads (TMDL) are the allowable pollutant loadings allocated to various pollution sources as necessary to achieve water quality standards in a given water body. Best management practices (BMPs) are water quality protection measures developed pursuant to the Clean Water Act, certified by the state agency with water pollution control authority and approved by the Environmental Protection Agency. Existing Forest Service and BLM land use plans require the use of best management practices. Therefore, best management practices must be followed to meet water quality requirements pursuant to the Federal Clean Water Act.

**Comment:** The Draft EISs do not comply with the Wilderness Act.

**Response:** This EIS does not propose to change, modify, or adjust existing designated wilderness areas, and it does not recommend designation of



new wilderness areas. The agencies may decide to consider the suitability of any area for preservation as wilderness during subsequent land use plan revision processes.

**Comment:** The Draft EISs are in violation of the Endangered Species Act.

**Response:** The effects on all listed species in the project area have been considered and disclosed. Coordination with the U. S. Fish and Wildlife Service and National Marine Fisheries Service has been underway since the project began, and formal consultation will be completed before the Record of Decision is signed. The two action alternatives developed in the Supplemental Draft EIS address concerns about terrestrial and aquatic species habitat based in part on new findings published in *Source Habitat for Terrestrial Species of Focus (Wisdom et al. in press)*. Consultation on the Endangered Species Act is described in the federal, state, and Local Environmental Protection Laws and Policies section of Chapter 1 of the Supplemental Draft EIS.

**Comment:** The Draft EISs are not in compliance with the 1872 Mining Law.

**Narrative:** Several respondents assert that the preferred alternative will potentially prohibit mineral operations in the project area when the Record of Decision is signed; they feel such effects would be in violation of the 1872 Mining Law.

**Response:** The Draft EISs do not propose to withdraw from mineral entry areas of locatable, salable, and leasable minerals. The standards pertaining to permits, rights-of-way, and easements have been modified to reflect the limited authority the land management agencies have in achieving Riparian Conservation Area objectives where valid existing rights are present. In some cases, however, the agencies have the authority to require reasonable conditions to minimize the impacts of certain uses including mining.

**Comment:** Relationships of the EIS to other federal, state, and local laws and regulations is incomplete and does not address the full realm of environmental laws which must be met by BLM and the Forest Service.

**Narrative:** Respondents ask that at a minimum the EIS should add a table or section addressing the following:

- ♦ *Wild and Scenic River Act (federal/state)*
- ♦ *Safe Drinking Water Act*
- ♦ *Oregon Groundwater Act*
- ♦ *Resource Conservation and Recovery Act on Hazardous and Solid Waste regulations including underground and above ground storage tanks*
- ♦ *Other programs under the Clean Water Act such as 401 certification, storm water permits*
- ♦ *Toxic Use Reduction and Hazardous Waste Reduction Act*
- ♦ *Clean Air Act*
- ♦ *EPCRA Section 313*
- ♦ *TSCA*
- ♦ *Superfund Amendments*
- ♦ *Oregon Land Use Regulations*
- ♦ *Federal Livestock Grazing*
- ♦ *Surface Mining and Reclamation Act*
- ♦ *CERCLA*
- ♦ *Federal Water Pollution Control*
- ♦ *The Oregon Plan*

**Response:** Some federal laws contain provisions for state administration of specific environmental programs or for making state laws applicable to federal lands and facilities. State and local laws relating to the health, safety, and welfare of people apply to activities on federal lands so long as the activities are also consistent with federal laws and regulations. Many of the laws and regulations listed above address issues that are at a finer scale than this EIS



addresses. The intent of the Record of Decision is to be compatible with these legal requirements; however, compliance can be assured only at finer scale planning levels.

**Comment:** Implementation of standards AQ-S6 through AQ-S10 and R-S14 will lead to technical violations of state laws and rules in Montana.

**Narrative:** *With regard to standards AQ-S6 and R-S14 (Alternatives 4, 5, 6, and 7), some respondents suggest that Montana already has adequate, well accepted, effective, and institutionalized standards and guidelines for the protection of stream functions. They feel that the implementation of AQ-S6 through AQ-S10 will be confusing to administer. They also believe these standards will be confusing to Montana operators who are well versed in the application of Montana's Streamside Management Act (SMZ Law and Rules). Furthermore, these respondents suggest that the implementation of these aquatic standards will likely lead to technical violations of the SMZ law and rules, and by association, the Clean Water Act.*

**Response:** These standards, which were included under the aquatic standards-timber management section in the Draft EISs, are not included in the Supplemental Draft EIS. The concepts contained in them have either been incorporated into the restoration direction, identified as too fine-scale, or replaced by new Riparian Conservation Area direction.

The principal federal laws that apply to forestry practices and protection of water quality are discussed in this EIS and in the Forest Service and BLM land use plans that are being amended. Among the many laws that guide timber management activities are the National Environmental Policy Act, Federal Land Policy and Management Act, National Forest Management Act, Endangered Species Act, Clean Water Act, and Clean Air Act. State forestry practices rules apply to logging activity on state and private lands; therefore, implementation of direction in this EIS would not be in violation of Montana's state laws since they apply to different lands.



# Biophysical Components of the Ecosystem

This section includes public comments specifically related to the biological and physical components of ecosystems in Chapters 2 (Affected Environment), 3 (Description of the Alternatives), and 4 (Environmental Consequences), and some of the appendices of the Draft EISs. Subsections include soil quality and productivity, air quality, wild and prescribed fire effects, insects and disease, forest health, rangeland health, aquatic health, plants, wildlife, effects on specific wildlife species, and fish.

## Soil Quality and Productivity

**Comment:** Broad-based soils data and standards are inappropriate in light of local conditions such as geological and climatic variables. Such data and analysis used in the Draft EISs are inadequate for determining effects of the alternatives.

**Narrative:** *Some individuals note that discussion in the Draft EISs regarding downed woody debris levels may be inappropriate for arid areas. Some feel that the Draft EIS data and analysis fail to account for local geologic features, and fail to distinguish granitic and non-granitic soils. Some individuals feel that the soil analysis was opinion-based, qualitative, and unsubstantiated.*

*Some state that cause-and-effect of declining soil productivity was unclear, and that a more detailed analysis is needed to clearly address this issue. According to some respondents, additional inventory should compare trends and annual forest productivity. Some ask for clarification or scientific documentation on statements claiming that "many soils take less than 50 years to recover naturally from compaction."*

**Response:** The Draft EISs contain specific language for soil productivity, including large downed wood requirements, that provides flexibility in ecological prescriptions based on the geologic, climatic, and vegetative characteristics of a particular area. Since

release of the Draft EISs, the Science Advisory Group (SAG) has used additional information to develop levels for large downed wood and snags that can be supported by potential vegetation groups (PVGs), which are based on historical levels of downed wood and snags and fire/disturbance patterns.

In the Supplemental Draft EIS, basic assumptions indicate Alternative S1 (no action) most closely resembles continuation of conventional management activities with a trend toward more conservative applications; Alternatives S2 and S3 contain a general emphasis to protect and restore ecological processes and conditions, and include new standards that address coarse woody debris recommendations for soil productivity.

Tables in the Draft EISs which display ranges for coarse woody debris requirements are based on research conducted in Rocky Mountain forests. The study areas are characteristic of the climate regimes, western montane soils, and habitat types/potential vegetation groups occurring within the interior Columbia River Basin. The ranges are intentionally conservative, which allow a margin of safety for varying geologic, climatic, and vegetative conditions, and also provide an emphasis for restoration of lands that have declining, or stable but below desired levels, of soil productivity resulting from past management activities (Graham et al. 1994). Following these assumptions and the information pertaining to the conditions, trends, and general effects of management activities on soil productivity in the *Biophysical Environment* (Jensen et al. 1997) chapter of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), effects from all alternatives have the intent of improving trends in soil productivity.

The expert panel contributing to the soils analysis was composed of scientists with specific knowledge of soil conditions and productivity trends across the interior Columbia Basin. Causes leading to declines in soil productivity stem from negative impacts to the physical and biological soil properties that result mostly from greater intensities of vegetation management, roading, and grazing. This information is presented in a condensed format in Chapter 2 of the



EIS, which was derived from the *Biophysical Environment* (Jensen et al. 1997) chapter of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997).

## Soil Productivity

**Comment:** Terms such as 'soil quality' and 'soil productivity' are unclear and should be defined or clarified.

**Response:** Soil productivity was defined in the Draft EIS Glossary (under productivity) and in the Key Terms box at the beginning of the Physical Environment section of Chapter 2. These definitions have been included in the Supplemental Draft EIS. The soil quality discussion was removed from the soil productivity section in the Supplemental Draft EIS to clarify the discussion. The *Biophysical Environment* (Jensen et al. 1997) chapter of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) contains a more specific description of soil productivity.

**Comment:** The reliability and effectiveness of Best Management Practices remains unclear.

**Narrative:** *Some individuals feel that statements in the Draft EISs that support Best Management Practices and mitigation measures as tools for slowing or reversing decreases in soil productivity, were not supported by scientific evidence.*

**Response:** Best Management Practices (BMPs) language is commonly used in reference to nonpoint source pollution control and water quality. The root definition of BMPs can be found in 40 CFR 130.2, where the Environmental Protection Agency (EPA) guidance states, in part: "BMPs are methods, measures, or practices to prevent or reduce water pollution, including but not limited to, structural and non-structural controls, operation and maintenance procedures, other requirements and scheduling and distribution of activities. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility."

Following this guidance, BMPs that are either curative or preventative have been developed for a number of forestry and rangeland management activities. Those BMPs that have passed a high degree of technical, political, and regulatory rigor are contained in land management conservation practices handbooks or technical guides and reports and have been imple-

mented by the Forest Service and BLM. Numerous scientific studies have been completed on the effectiveness of BMPs, specifically those related to forest practices (Seyedbagheri 1996). The common conclusion is that BMP effectiveness depends on the proper application and implementation rather than the practice itself.

**Comment:** The Draft EISs present conflicting statements regarding historical levels of soil organic matter and coarse wood. These statements require clarification and/or scientific documentation.

**Narrative:** *Some respondents note that the statement "levels of carbon and nutrients tied up in woody material are higher than they were historically" (Eastside Draft EIS, page 2-68) is in conflict with the statement, "soil organic matter and coarse wood have been lost or have decreased" (Eastside Draft EIS, page 2-18). They ask that these statements be reconciled or clarified.*

**Response:** The statement "levels of carbon and nutrients tied up in woody material are higher than they were historically" refers specifically to dry forest types where fire suppression has been the dominant human-related disturbance. According to Oliver (1994), the lack of naturally occurring frequent, but low intensity fires in these vegetation types converts open, shade-intolerant stands to dense, shade-tolerant forests. The net change is an overall increase in biomass (carbon) in standing, live trees and eventually downed woody material. If wildfire burns these areas, the unnaturally high levels of both standing and downed wood can contribute to severe, uncharacteristic effects where the additional volume of wood is consumed through longer burning time and higher temperatures that result in the carbon being volatilized and lost as available nutrients (Agee 1993). In terms of fire suppression, the statements in question do not conflict, but actually complement each other in that they have been identified as sequential events.

In addition to losses by wildfire, past activities such as timber harvest and livestock grazing that remove vegetation also create conditions where "soil organic matter and coarse wood have been lost or have decreased." Where human disturbances have primarily been the extraction of forest products, direct and indirect effects on soil productivity have occurred through the complete removal of standing and downed logs and loss of organic matter by erosion or other disturbances.



**Comment:** Information on vegetation loss and soil productivity should be clarified.

**Narrative:** *Some respondents note that the text states that vegetation manipulation in the direction of historical range of variability (that is, selective tree removal) is more likely to sustain soil productivity, but the Draft EISs imply that vegetation loss contributes to the loss of soil production. They ask that conflicting assumptions be clarified.*

**Response:** Past land management practices were generally not consistent with natural disturbance processes and patterns. Direct negative impacts on soil productivity occurred with large-scale removal of whole trees and limbs and soil compaction; indirect negative effects, including soil erosion and loss of organic matter, also occur from ground disturbance.

Current forest management approaches (within the past 10 years) are implemented with substantial changes in harvest methods and techniques and silvicultural prescriptions. Instead of large clearcuts and mechanical site-preparation, managers now use selective tree removals and low intensity burning. These changes are intended to emulate natural disturbance processes and patterns by vegetative type, and allow for maintenance and restoration of soil productivity and nutrient cycling under conditions similar to those under which the soils originated.

## Management Activity Effects on Soil

**Comment:** The Draft EISs do not recognize that management activities affect soil conditions and productivity. Opinions diverge on whether emphasis should be on prevention of impacts, or on mitigation and restoration.

**Response:** The Summary of Conditions and Trends for Soil and Soil Productivity in the Draft EISs attribute current declines in soil productivity to greater intensities of vegetation management, roading, and livestock grazing (Eastside Draft EIS page 2-18, UCRB Draft EIS page 2-9). The alternatives in the Supplemental Draft EIS include management direction for prevention of impacts through mitigation and restoration of degraded areas with important ecological character.

**Comment:** The effects of the alternatives on soils in the Draft EISs should be clarified by organizing and comparing effects around each of the four bulleted Desired Range of Future Conditions (DRFCs) for soils.

**Narrative:** *Some individuals feel that effects on soils, fungi, and micro-organisms from logging activities – including road building, erosion, and soil compaction – were not adequately addressed. Some state that modern timber practices have greatly reduced unwanted impacts. Other individuals feel that effects on soils from grazing – such as soil compaction and the decline of native species – were not adequately addressed in the Draft EISs. Some respondents suggest that the EISs compare the desired range of future conditions in Chapter 3 to the soils effects in Chapter 4 and assess the effects of alternatives on DRFCs.*

**Response:** In the Supplemental Draft EIS, the DRFCs for soils have been incorporated in the appropriate objectives. The organization of the effects analysis in the Supplemental Draft EIS was improved to clarify how the alternatives affect soil productivity, and to better present the potential outcomes of soil productivity relative to the proposed management direction.

## Mitigation of Impacts and Restoration of Soils

**Comment:** The Draft EISs do not adequately discuss the role of fire in site degradation and loss of soil productivity, comparison of fire and logging effects on soils, and the environmental consequences of increased levels of coarse woody debris.

**Narrative:** *Some individuals feel that the Draft EISs do not recognize that wildfire could decrease soil productivity and have greater long-term impacts than logging. They request more analysis of the relationship between coarse woody debris and fire and the environmental consequences of increased coarse wood. Some suggest a need for more active management to increase downed wood to restore soil conditions. Management after fire should include an explicit effort to restore soil crusts, not just vegetation and litter.*

**Response:** Both the Draft EISs and the Supplemental Draft EIS include a discussion in Chapter 2 of the role of fire and its potential to change soil characteristics and productivity. Effects of the alternatives on soil productivity, including those based on trends for uncharacteristic wildfire, and snag and downed wood amounts are analyzed in Chapter 4 of the Supplemental Draft EIS.

**Comment:** The Draft EISs do not adequately describe or prescribe levels of coarse woody debris and snags required to accomplish desired goals and outputs, especially for Alternative 4, objective PE-O4 and standard PE-S1.



**Narrative:** *Some individuals suggest that levels of coarse woody debris under Alternative 4 should be increased to restore soils, or that objective PE-O4 be clarified to identify levels of coarse woody debris needed. Others argue that the requirements under standard PE-S1 appear excessive and conflict with scientific literature.*

*Some respondents feel there is a lack of scientific accuracy in the standards dealing with snags and woody debris and they ask that these standards be clarified in the EIS. Some say the management direction may alter restoration plans and affect expectations and prescriptions of timber harvests. Some believe snag densities and downed woody debris need a more comprehensive strategy to meet wildlife habitat needs in the project area. Some view these fuels as "match sticks" which can sway restoration and commercial harvest decisions. They believe that the snag densities for wildlife in the Draft EISs cannot be applied across the entire project area, suggesting that local standards are better suited for effective habitat planning. While some people suggest harvesting the trees to reduce fuel loading, others defend snags as essential for habitat needs and recommend their inclusion in preservation measures.*

**Response:** Since release of the Draft EISs, the Science Advisory Group used additional information to develop levels for large downed wood and snags that can be supported by potential vegetation groups (PVGs), which are based on historical levels and fire/disturbance regimes. Alternatives S2 and S3 in the Supplemental Draft EIS include new integrated standards that address coarse woody debris and snag recommendations for wildlife, wildfire, and soil productivity. Appendix 12 contains more information on snags and downed wood.

**Comment:** Standards for Alternative 7 are incorrectly based on Table B; there is no justification for not using Table A standards which show higher values and are used for Alternative 4.

**Response:** In comparing alternatives in the Draft EISs, Alternative 4 would emphasize more aggressive restoration while Alternative 7 would simulate more current levels of activities with improving trend in conditions. The rationale for Alternative 7 using Table B was based on reductions in proposed activities (spatially and in overall numbers) combined with lower intensity in implementation of those activities under Alternative 7 as compared to Alternative 4. The rationale follows the assumption that Alternative 7 would result in less overall soil disturbance than Alternative 4, with greater emphasis directed toward natural processes to account for inputs of coarse woody debris.

Since release of the Draft EISs, the Science Advisory Group used additional information to develop levels for large downed wood and snags that can be supported by potential vegetation groups (PVGs), which are based on historical levels and fire/disturbance regimes. By using PVGs, the soil conditions and measures of soil productivity are expressed relative to the historical conditions on which the soils developed and the vegetation groups which they supported. Alternatives S2 and S3 in the Supplemental Draft EIS includes new standards that address coarse woody debris and snag recommendations for soil productivity. Appendix 12 contains more information on snags and downed wood.

## Air Quality

**Comment:** Air quality in the interior Columbia River Basin was not analyzed adequately, including cumulative effects and current and historical conditions.

**Narrative:** *Some individuals contend that the Science Integration Team and the Draft EISs do not present a full air quality analysis of the project area, but instead inconsistently studied only convenient areas. They want to see trends and their causes across the entire area, not only for the present and future but also considering historical air quality conditions. At least one respondent feels that the Draft EISs don't recognize the effects that prescribed burning would have on the air quality of local communities.*

**Response:** The analysis for the Draft EISs and the Supplemental Draft EIS includes the cumulative effects of prescribed fire on federally managed lands across the basin. The results of modeling imply that air quality within the interior Columbia River Basin would not be seriously degraded, even with a 16-fold increase in prescribed burning over current levels. The precise locations and timing of future prescribed burns, and the meteorological conditions under which they might burn cannot be predicted with enough accuracy across the project area to predict potential human health impacts at this time.

Modeling at a finer scale might be possible for planning purposes; however, prescribed burn decisions are made with real time data and observation, including monitoring information, which are combined with mitigation measures to avoid impacts to human health. Emissions from prescribed fires are monitored



by personnel conducting the burns. The states, and sometimes the federal land management agencies in cooperation with states, currently monitor airsheds in many cities and a number of smaller communities. Observations from prescribed burn sites and data from the states' monitoring is regularly used in the decision process for selecting which, how many, and where, prescribed burns can occur, if any.

Historical air quality information across the project area is generally very lacking, and therefore an analysis of trends is not possible.

**Comment:** The EIS should fully analyze the impacts on human health caused by air quality degradation from prescribed fire, including cumulative effects.

**Narrative:** *Some people feel the Draft EISs did not sufficiently consider the potentially adverse effects of increased smoke to human health. Some individuals request clarification of how mitigation can occur through monitoring (Eastside Draft EIS page 4-18).*

**Response:** The analysis for the Draft EISs and the Supplemental Draft EIS compared varying levels of burning across the project area. The results of modeling imply that air quality within the basin would not be seriously degraded. However, a modeling analysis used to evaluate programmatic changes to a prescribed fire program cannot fully answer whether human health standards would be attained or violated. The precise locations and timing of future prescribed burns, and the meteorological conditions under which they might burn cannot be predicted with enough accuracy across the basin at this time.

Criteria pollutants emitted from prescribed fire could be mitigated by: (1) eliminating the source, (2) decreasing the emissions, (3) burning under better dispersion and mixing conditions, and/or (4) burning under a different wind flow pattern.

In the short term, emissions from prescribed fires are monitored by personnel conducting the burns. The states, and sometimes the federal land management agencies in cooperation with states, monitor airsheds in many cities and a number of smaller communities. Observations from prescribed burn sites and data from the states' monitoring is regularly used in the decision process for selecting which, how many, and where prescribed burns can occur, if any. The ignition process can also sometimes be halted. The meteorological conditions under which prescribed burns are ignited are also closely monitored (1) to avoid impacts of the burns, (2) to be analyzed in conjunction with smoke data, and (3) to assist with

future decision making on the location, types, and number of prescribed burns that can be implemented without causing human health impacts.

In the longer term, project plans and prescribed burn plans can be designed to reduce the amounts and/or possible impacts of emissions by reducing the amount of fuel that can burn and the amount of time that larger fuels and duff can smolder. These plans are appropriately addressed at a finer scale than this broad-scale EIS.

**Comment:** Text in the Eastside Draft EIS, p. 2-28, states that PM<sub>10</sub> affects humans but not ecosystems. This incorrectly implies that humans are not part of ecosystems.

**Response:** The authors of the Draft EISs did not intend to imply that humans are not part of ecosystem. However, regulations under the Clean Air Act distinguish between effects on human health, and those on the ecosystem or environment. The section in the Eastside Draft EIS that the commentor refers to (Protection of National Ambient Air Quality Standards), was specifically referring to the protection of human health, and the language is correct in this context. In an evolutionary context of fire being a natural ecosystem process, with smoke as a product of that process, the language is also correct.

**Comment:** The list of causes of effects on air quality is incomplete and should include: (1) differences in frequency and distribution of acres burned, (2) differences in total number of acres burned, and (3) differences in wildfire and prescribed fire emission factors.

**Response:** Analysis of acres burned by wildfire and prescribed fire by RAC/PAC and by alternative has been enhanced in the Supplemental Draft EIS. While it is acknowledged that there would often be differences in emission factors between wildfires and prescribed fire (such as the emission factors for crown fire versus understory burning), the emission factors used in the analysis within the Supplemental Draft EIS is limited to the current state-of-the-art scientific methods. Even had more emissions factors been available, the modeling would still need to make broad assumptions on the proportions of each type of fire (crown fire, understory fire, piles/accumulations, etc.) for both wildfire (which might burn over a number of days under quite variable weather and fuels conditions, and hence have highly variable fire behavior) and prescribed fire (which would tend to burn under variable conditions across landscapes).



**Comment:** The statement (Eastside page 4-28) that "visibility impairment is fairly equivalent between the March and May scenarios (Tables 4-8 and 4-9), while the October scenario (Table 4-10) has much greater loss of visibility" does not match the results shown in Tables 4-8 through 4-10. It appears that the wrong values were entered for Table 4-10.

**Response:** The necessary corrections to Table 4-10 are noted. This table is not included in the Supplemental Draft EIS, where prescribed burn scenarios are presented more graphically for the project area as a whole.

**Comment:** The EIS should provide an explanation of how negative outcomes for air quality can be projected for all alternatives while still meeting the purpose and need.

**Response:** The air quality modeling indicated that there may be much greater effects on air quality from wildfires than from prescribed fire. With the increase in amount of prescribed burning in Alternatives S2 and S3, fuel levels would decrease, which would decrease the frequency and intensity of wildfires, thus lessening negative effects on air quality in the long term. In addition, the management direction requires coordination with other agencies, consideration of other sources of particulates in the area, and a balance of short- and long-term risk to air quality and resource conditions.

**Comment:** Air quality impacts must conform to state and federal laws, including the Clean Air Act.

**Narrative:** *Some individuals feel that the Draft EISs inadequately addressed how prescribed burning will affect federal and state air quality standards called for under the Clean Air Act. They also believe that new National Ambient Air Quality Standards (NAAQSs) for fine particles and new regional haze rules for visibility need to be considered, and a Prevention of Significant Deterioration (PSD) analysis should be conducted.*

**Response:** Management activities must conform to applicable state and federal air quality regulations and laws. The Draft and Supplemental Draft EISs demonstrate adherence to applicable air quality regulations at the programmatic level, and state that "(m)ore detailed air quality analyses should be conducted at subsequent planning levels when emissions can be more accurately quantified and the locations and meteorology associated with a specific burn are known." The implementation regulations of new National Ambient Air Quality Standards (NAAQS) for fine particulates have been remanded to

a U.S. District Court by an Appeals Court, and their implementation is unclear and uncertain at this time.

Implementation of other regulations adopted after the 1990 Clean Air Act Amendment have similarly been suspended as of this writing, and it is not yet clear if the regional haze regulations will be implemented as scheduled. The fine particulate matter implementation schedule that was suspended called for a few years of monitoring data, which is not yet available. Prescribed fires are considered area sources of emissions, therefore they do not fall under the new source review regulations for point sources, which require PSD analysis. Hence, the PSD analyses requirement does not apply to prescribed fires.

**Comment:** Methods and methodology in air quality modeling were flawed in the Draft EISs. They address only fire and not other emissions, and they underestimated the effects of prescribed fire. They should be corrected.

**Narrative:** *Some people feel that the analysis does not address emissions from any other activities, including industrial emissions, vehicle emissions, transported pollution, or building and use of roads. They note that states routinely consider the inventory of all existing sources in an air basin when considering a permit for a major new source of air pollutants. One respondent suggests using atmospheric dispersion modeling and other methods.*

**Response:** Industrial and urban emissions were not analyzed because they fall outside the project's jurisdiction and scope. The Draft EISs and the Supplemental Draft EIS focus on those criteria pollutants which could be generated by the potential management actions proposed and analyzed in the EIS. As stated in the EIS, these criteria pollutants would not likely have an impact on public health "because of the small levels produced and the rapid dilution or modification of these substances within relatively short time frames." However, it was acknowledged in the EIS that healthy and diverse ecosystems are better able to withstand the effects of these urban and industrial emissions.

Both dispersion modeling and emission production modeling were used in the analysis of air quality effects in the Draft EISs and the Supplemental Draft EIS.

States routinely consider the inventory of all existing sources in an air basin when considering a permit for a major new source of air pollutants. However, the new source review and permitting process apply only to stationary sources, not to area sources, and prescribed fire is classified as an area source.



Management direction was added to the Supplemental Draft EIS which requires consideration of impacts from other sources of particulates when considering a prescribed burning project.

**Comment:** Standard PE-S4 and objective PE-O5 do not require the same permitting and analysis for prescribed burns as for other emissions sources. This should be corrected in the EIS.

**Response:** The permitting and analysis process for prescribed fire emissions is not the same as for other sources of emissions because the laws and regulations for prescribed fire emissions are for area sources, rather than for stationary sources. Hence, the requirements are not the same. Standard PE-S4 was not carried forward to the Supplemental Draft EIS. However, many of its components can be found in the management direction for fire management and air quality.

**Comment:** The statement on page 2-17 of the Eastside Draft EIS, that general conformity requirements apply only within non-attainment areas does not agree with EPA guidance and should be corrected in the EIS.

**Response:** While the EPA had intended to generate a general conformity rule that covered all lands, the only applicable requirements for general conformity are those that have been passed in final form. For specific language on applicability to non-attainment areas and maintenance areas only refer to 40 CFR 51.853.

**Comment:** The Draft EISs do not consider that actions within 100 kilometers of a Class 1 airshed are subject to a public participation process.

**Response:** In reference to the new source review process that applies to stationary sources, the management actions proposed and analyzed in the Draft EISs and the Supplemental Draft EIS include prescribed fire, which is an area source, not a stationary source, by regulatory definition. In this case, the rule referred to does not apply. However, public involvement is an essential part of the appropriate National Environmental Policy Act process for project-level proposed actions. This would take place at the local level during site-specific analysis, and the public will have further opportunities to provide input to any proposed actions.

**Comment:** The EIS should include current and recent historical conditions, using existing federal, state, and local data.

**Response:** It does, to the extent possible and practicable. The analysis for the Draft EISs and the Supplemental Draft EIS used information which was available. Under the Clean Air Act, the states have been given the authority to monitor and enforce air quality standards. However, scientifically collected air quality data is very expensive; thus, states have collected data only where there were known or suspected air quality problems. Often, information was available only for specific locations and/or for a very short period of time. Historical air quality information across the interior Columbia River Basin is generally lacking.

## Wild and Prescribed Fire Effects

### Wild and Prescribed Fire Effects

**Comment:** The management strategies (Conserve, Restore, Produce) do not adequately accommodate disturbances because they do not allow for flexibility in application or include risk evaluation.

**Narrative:** *Some suggest that the Draft EISs do not accommodate necessary disturbance (both anticipated and unforeseen) because of "multiple-use zoning" and varying management emphases (Conserve, Restore, Produce). These respondents feel that management direction should be based on a holistic approach, with flexibility in standards to accommodate disturbances such as fire. Some say that the standards supporting the natural disturbance objective are weak and in need of a requirement for risk assessment associated with the development of prescribed fire plans.*

**Response:** Standards for fire management activities and wildland fire have been changed and clarified in the Supplemental Draft EIS. Direction is included for assessing and balancing fire risks at the broad scale; however, risk assessment of prescribed fire projects are best addressed in prescribed fire plans, which include site-specific information. Additionally,



adaptive management allows for changes in management methods to accommodate unforeseen and unpredicted local events.

**Comment:** The Draft EISs do not take into account the increased potential of catastrophic wildfires caused by an increased use of prescribed and natural fire.

**Narrative:** *Many respondents feel that prescribed burns are likely to become uncontrolled burns because of years of fire suppression and the fuel buildup associated with it.*

**Response:** As stated in the *Federal Wildland Fire Management Policy and Program Review* (USDA and USDI, 1995), "Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity... Planning must also consider the risks, probabilities, and consequences of various management strategies, such as fire use versus fire exclusion."

There is always some inherent risk with using prescribed fire as a management tool and allowing it to function as an ecosystem process. In some cases, manual or mechanical treatment may be necessary to reduce risk before prescribed fire can be used; in other cases, these methods may be required to replace fire when the risk and consequences are both too high. However, these are decisions that must be based on local, site-specific analyses, and cannot be addressed in a programmatic EIS of this scale. The EIS recognizes the magnitude of the problems associated with the accumulation of fuels and increases in forest stand density due to nearly a century of fire exclusion. New scientific analysis on these ecosystem changes have been incorporated in the Supplemental Draft EIS.

## Restoring Fire as a Process

**Comment:** The Draft EISs do not adequately consider the role of wildfire as a tool for restoring ecosystems on public land.

**Narrative:** *Some individuals want a more careful comparison of probable effects of active and passive management activities and their potential to increase risks of damage from severe wildfire. Others suggest that the selected alternative should abandon fire suppression policies and practices and increase use of both prescribed and natural fire.*

**Response:** The *Federal Wildland Fire Management Policy and Program Review* (USDA and USDI 1995) stated that "Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity... Planning must also consider risks, probabilities, and consequences of various management strategies, such as fire use versus fire exclusion."

The *Federal Wildland Fire Management Policy and Program Review* stated that fire suppression must remain an integral component of fire management policy, "Federal agencies [will] maintain preparedness planning and suppression programs to prevent unacceptable loss from fire" (page 19). The recommended set of fire management policies of the review include the use of fire (wildland fire and prescribed fire) in its natural ecological role, where it is consistent with other land and resource management objectives as well as with other social concerns and objectives (such as safety, risk management, air quality management, and economic efficiency). In addition, the use of fire must be consistent with agency policy. Fire suppression remains a vital part of agency policy. Changes in ecosystem conditions due to fire exclusion and other management actions will sometimes preclude the use of fire, without some intervening active management action, such as removing accumulated fuels or changing forest stand structure or density.

The Supplemental Draft EIS recognizes the essential role that wildfire plays in ecological processes. Management direction in Chapter 3 further specifies that wildfire management should emphasize protection or restoration of key habitats.

**Comment:** The Draft EISs do not address adequately cumulative effects of prescribed fire on plants, terrestrial animals, and fish.

**Narrative:** *Some people believe that effects of prescribed spring and fall burning on plants and animals are not analyzed adequately. They feel that inherent conflicts and tradeoffs between desired conditions and habitat requirements for aquatic species, big game, and woodpeckers need to be displayed. Some request the elimination of all guidelines that promote prescribed natural fire, stating that prescribed natural fire should be promoted only under proper forest conditions.*



**Response:** Chapter 3 in the Supplemental Draft EIS provides direction on the use of fire, including "wildland fire use for resource benefit" (previously referred to as "prescribed natural fire"). Wildland fire use is permitted only under stringent management prescriptions, which include vegetation conditions, weather and fuel conditions, and other management considerations to evaluate risk and benefit. The Science Team considered prescribed fire levels and effects of fire on habitat components, such as on snags and large woody debris retention, during their evaluations of alternatives for the Draft and Supplemental Draft EISs. These effects (both direct effects and cumulative effects) are disclosed in Chapter 4 in the Supplemental Draft EIS.

**Comment:** The Draft EISs do not state the methods and rationale for computing annual wildfire acreage.

**Narrative:** *Individuals note that the Draft EISs do not indicate whether the incidence of wildfire in a grid cell influences the future probability of wildfire assigned to that cell. They ask that the methods and rationale for computing annual wildfire acreage be clearly stated.*

**Response:** The probability of recurrence of wildfire within a grid cell was dependent on the successional pathway that would occur in that cell (that is, the vegetation that was there before the fire, potential vegetation type, vegetation that would follow the disturbance, and type of management that would occur). Discussion of the methods used to compute wildfire acreage can be found on pages 4-56 through 4-61 of the Draft EISs. The Supplemental Draft EIS contains additional explanation of the methods used, as well as references to scientific documents that describe modeling techniques and that have been published since the Draft EIS.

**Comment:** The intent of the statement in the guidelines, "Consider using liberal prescribed natural fire prescriptions," is not clear. The words 'consider' and 'liberal' should be eliminated or clarified.

**Response:** Standards and objectives are required activities that must be adhered to, but guidelines are recommended courses of action to help meet the goals and objectives of a project. Therefore, a term such as 'consider' is appropriate when referring to guidelines, which are optional and in general do not have measurable outcomes. The term 'liberal' has been removed from the guidelines.

## Fire Management

**Comment:** The EIS should fully analyze a proper balance among timber harvest, commercial thinning, and prescribed fire.

**Narrative:** *Some respondents argue that the current buildup of excessive fuels requires active management direction be given for a combination of salvaging and thinning timber before prescribed fire is to be implemented. Others state that timber harvest increases fire severity and should be accompanied by fuel reduction. They feel that the relationship among the different forest management activities needs to be clarified and evaluated.*

**Response:** Management direction in the Supplemental Draft EIS requires maintaining and promoting ecological processes; and managing vegetation structure, stand density, species composition, patch, pattern, and fuel loading and distribution to reduce the prevalence of uncharacteristically large and severe disturbances, and to facilitate resilience of landscape succession and disturbance regimes and terrestrial source habitats.

A mix of forest management activities is proposed at the broad scale to restore and maintain forest health, including timber harvest, thinning, prescribed burning, prescribed fire plans, decreased roading, and watershed restoration. Specific choices of which management activities would achieve goals and objectives will be made at the local level considering local conditions and management issues. Therefore, the specific balance of activities will depend on local conditions and needs.

**Comment:** Fire management information in the Draft EISs is incomplete.

**Narrative:** *Some respondents feel that the Draft EISs do not analyze adequately impacts of fire management direction on fire-prone areas, including utility corridors and private property at the wildland-urban interface. They think that impacts of weather patterns, timing of fire activities, and fire management in roadless areas need to be considered. Some feel that the Fire Regime Severity maps lack clarity and are misleading.*

**Response:** Effects of fire management direction on utility corridors and in specific roadless areas, effects of weather patterns, and timing of fire activities are more appropriately analyzed at a local scale, such as in Forest Service and BLM land use plans, site-specific environmental analyses, and local fire management



plans, rather than at the broad scale of this EIS. Discussion of fire in urban-rural-wildland interface areas can be found in the Social-Economic-Tribal section of Chapter 2. Potential effects of prescribed fire/fuels management on communities can be found in the Social-Economic-Tribal section of Chapter 4. The fire regime severity map (Map 2-9) has been redesigned for enhanced clarity.

**Comment:** The coordination of fire management programs should not be optional but should be a requirement for the region to ensure successful implementation of EIS goals and objectives.

**Response:** Coordination and collaboration are key aspects of management direction (including objectives for fire management and air quality) throughout both action alternatives in the Supplemental Draft EIS. In addition to these objectives, at least one standard requires consultation with appropriate local, tribal, state, and other adjacent air quality management organizations prior to prescribed burning activities or decisions to use wildfire to achieve management objectives. Direction mandating coordination is also included in the *Federal Wildland Fire Management Policy and Program Review* (USDA and USDI 1995), which applies to both the BLM and the Forest Service.

**Comment:** Objective TS-O2 does not give resource managers the guidelines necessary to implement the stated fire management strategy.

**Response:** The *Scientific Assessment* and other studies conducted in the project area have shown that decades of fire suppression have caused unintended consequences, and that restoration of fire as a natural process would help achieve many land management and societal goals. Therefore, the importance of restoring fire as a natural disturbance process has been emphasized in the EIS. Objective TS-O2 has been rewritten and additional management direction has been added to the Supplemental Draft EIS to make this intent clearer.

Additional guidance can be found in the *Federal Wildland Fire Management Policy and Program Review* (USDA and USDI 1995).

**Comment:** The Draft EISs do not address the role of fire in the spread of noxious plant species.

**Narrative:** *One respondent asserts that the effect of prescribed burns on noxious species is not addressed. This person wonders if all native species are more fire adapted, and who decides which species to favor.*

**Response:** In the Supplemental Draft EIS, prescribed burning is described as a factor that could spread noxious weeds and other exotic undesirable plants. When prescribed burning is considered for use, the management direction recognizes that it may contribute to noxious weed increase and spread, and that subsequent weed control might be necessary. The intent of the direction is to plan ahead to reduce that risk.

## Rehabilitating Burned Areas

**Comment:** The Draft EISs do not completely display the effects of standard TS-S4 to maintain soil productivity by resting burned areas from grazing, including economic effects and effects on cooperative relationships.

**Narrative:** *Some individuals feel that the standard in the Draft EISs discourages the ranching community from becoming involved in fire management on rangelands. They fear that if funding for monitoring rangelands decreases, then monitoring effectiveness will decline as well. Some people claim that not all burned areas require the prescribed resting period, and they feel that standard TS-S4 is insufficient to restore rangeland health. They feel that soil crusts as well as vegetation and litter need to be established.*

**Response:** Rather than being specific about how to graze livestock to maintain soil productivity after burning, the Supplemental Draft EIS focuses on soil outcomes to achieve adequate cover to promote infiltration, soil water storage, and maintain soil stability in upland areas; soil surface conditions that support infiltration; and soil and vegetation conditions that provide opportunity for establishment of desirable plants. The expectation is that livestock grazing would be adjusted as deemed necessary at the site-specific scale to achieve the soil outcomes.

**Comment:** Standards TS-S2 and TS-S3 for rehabilitating disturbed areas with ecologically appropriate species are unclear. The use of native and non-native species in revegetation and restocking programs should be defined and discussed in the standard.

**Response:** Native and non-native plants play an integral part in the restoration process. Restoring or maintaining biodiversity and productivity of native plant communities is the specific focus of several Supplemental Draft EIS objectives and standards. Maintaining or improving habitat for native plant and animal species is a key feature



of several other objectives and standards in the terrestrial component of the ecosystem management strategy. The Supplemental Draft EIS continues an emphasis on the maintenance and restoration of native plant communities.

However, there are some areas in the interior Columbia River Basin where rehabilitation efforts to bring back native species has failed. Until advances in technology and knowledge of these systems allows successful rehabilitation of these areas with native species, these areas should be stabilized, and to the extent possible, planted with select non-native species. Non-native species can be used to provide the same characteristics and structure that was provided by the native species. These intentions are spelled out in the objectives and standards in the base level and restoration sections of the Supplemental Draft EIS.

**Comment:** Grazing should be delayed until the effects of grazing on burned areas are understood.

**Response:** While increased knowledge of specific effects of livestock grazing on particular plants or sites under specific burned conditions may be helpful to local managers, sufficient information on the effects of grazing on burned areas is available for providing management direction at the broad scale. This information is discussed in the Factors Influencing Ecosystem Health section in Chapter 2 of this EIS, and in Hann, Jones, Karl, et al. (1997).

**Comment:** The Draft EISs do not take landscape features into consideration when prescribing rehabilitation treatments.

**Narrative:** *Some feel that unless the landscape context is considered, restoration and rehabilitation will not be effective in making forests and tree stands more resilient.*

**Response:** Objectives, standards and guidelines in the landscape component of the Base Level and Restoration sections of Chapter 3 of the Supplemental Draft EIS focus on landscape-level processes and functions. This includes succession and disturbance patterns and processes in concert with the climate, landform and biological and physical characteristics of the ecosystem. Direction in the landscape component includes aquatics, terrestrial wildlife and plants, and socio-economic needs. Landscape restoration is the foundation of the strategy to manage long-term risk to aquatic and terrestrial species. The intent of landscape restoration direction is to repattern vegetative patches and succession/disturbance patterns to

restore watersheds and streams to a condition more consistent with the climate, landform, and biological and physical characteristics of the ecosystem.

## Management of Insects and Disease

**Comment:** The Draft EISs do not fully address the cumulative effects of management activities on insect disturbances, including effects on non-federal lands.

**Narrative:** *Some individuals feel the Draft EISs do not consider effects of ecosystem management activities such as thinning, burning, and even-aged management on insect disturbance rates. Some people are concerned about management responsibility for insect disturbances spreading from federal lands. They feel that cumulative forest ecosystem health hazards and risks as they relate to wildfire, insects, and disease potential have not been adequately identified. They feel that these hazards and risks could negatively affect other components of ecosystems in the basin and should be analyzed. Some suggest a need for more exact restrictions against thinning in Douglas-fir/grand fir forest types where root rot is present. Some suggest a need for more prescriptive measures to control insect disturbances.*

**Response:** Chapter 2 of the EIS discloses the current levels of insects, disease, and wildfire as well as changes from historical levels and trends. Chapter 4 discloses the expected effects of the alternatives on insect, disease, and wildfire levels. It also discloses the effects on other resources such as aquatic habitats, hydrologic resources, terrestrial habitats, social/economic, and tribal. These effects are based on the various levels of thinning, stewardship harvest, prescribed fire, and other restoration activities assumed to take place in each alternative.

Many privately owned forests are also susceptible to insect and disease outbreaks and wildfire. How susceptible these lands are to insects, disease, and wildfire depends on the current condition of those lands. The Science Advisory Group analyzed the effects associated with all land ownerships in the basin, to gain insights into potential cumulative effects. Their simulations assumed continuation of existing management direction and activity levels across non-Forest Service- or BLM-administered lands. Cumulative effects of the alternatives are disclosed in Chapter 4.



This EIS is broad-scale in its scope and outcome based in its nature. To add prescriptive standards and restriction concerning insect and disease control is inconsistent with the new focused direction (Babbitt/Glickman letter) and the need to maintain flexibility for local managers.

**Comment:** Table 4-28 is difficult to understand. It should be clarified as to whether spring prescribed burning might increase insect and disease problems.

**Response:** Comments such as this assisted the EIS Team in better clarifying the information presented in the Supplemental Draft EIS. Table 4-28 is not carried forth into the Supplemental Draft EIS. However, uncharacteristic insect and disease effects are discussed in the terrestrial upland vegetation section of Chapter 4.

**Comment:** The Draft EISs ignore the role many insects play in maintaining ecosystem health.

**Narrative:** *Some respondents note that insects play an important role in ecosystem health, as pollinators, food sources, and biological controls of potentially damaging species; they feel that these roles are overlooked in Draft EISs.*

**Response:** Insects play a very important and varied role in ecosystem health. This topic is discussed in Chapters 2 and 4 of the Draft EISs and the Supplemental Draft EIS as it relates to landscape disturbances, especially in the forested environments. However, the pollination of plants by insects and their role in the food chain is too fine scale for this broad-scale EIS.

## Forest Health

### Forest Health

**Comment:** Analysis of forest potential vegetation groups (PVGs) and seral stages is inconsistent, incomplete, or difficult to determine and understand.

**Narrative:** *Some respondents are confused about how riparian shrub and riparian herb PVGs are addressed, because Eastside Draft EIS Summary (pages 4-5) suggests that only a single 'riparian shrubland herb' PVG was used, but Eastside Chapter 2 page 129 indicates that three PVGs (riparian woodland, shrub, and herb) were grouped*

*together. Some respondents find Figures 2-8 and 2-9 difficult to understand; they felt these figures do not enable people to determine percentages of forest in various seral stages and shade tolerance categories. Some respondents feel that information is needed on what forest vegetation types have decreased to offset the increases in various vegetation types. Some feel that Table 3-2 (desired seral stages) should also include patch size ranges, and that standards HA-S2 and HA-S3 should be integrated with the desired seral stages.*

*Some people feel it is confusing to have potential vegetation groups presented in the affected environment but the evaluation of alternatives based on terrestrial communities; they think that all chapters should be based on the same parameters and ecosystem indicators. Some respondents feel that it would be beneficial to compare the projections with the Desired Range of Future Conditions (DRFCs) for each alternative, to demonstrate whether the alternatives achieve the DRFCs for PVGs and seral stages.*

**Response:** In the Supplemental Draft EIS, the terrestrial community types are better described, nested within PVGs, and crosswalked with PVGs. From the broad scale, classifying the landscape into potential vegetation groups is useful because it adds a time dimension to the classification. However, wildlife ecologists look more at the existing habitat (that is, cover type and vegetation structure) present on a site rather than at either the potential vegetation or possible future vegetation.

To improve understanding of the information in Figure 2-8 and 2-9 of the Draft EISs, the Supplemental Draft EIS communicates the shift from shade-intolerant forests to shade-tolerant forests more clearly. Interior ponderosa pine, western larch, western white pine, and whitebark pine cover types have declined within the project area as have the early seral and late seral forests, especially the late seral single story structure forest. This is stated in Chapter 2 of the Supplemental Draft EIS in text and figures.

The Supplemental Draft EIS better recognizes that forest and rangeland restoration are the same as terrestrial habitat restoration. Restoration activities that improve landscape health also improve terrestrial habitats because they help to provide a more appropriate mix of habitats on the landscape and make those habitats more sustainable in the long term. The Supplemental Draft EIS shows the inseparability of the desired conditions for the landscape and terrestrial habitats.

**Comment:** The potential vegetation group (PVG) classification is not adequate for determining need for restoration.



**Response:** Restoration needs were not determined from PVG classifications. To develop the alternative restoration strategies for the Draft EISs, information on forestland, rangeland, and aquatic ecosystems was organized by potential vegetation groups or watersheds and summarized by ecological reporting unit where possible. To provide an integrated picture, showing how existing conditions relate to each other and to identify where overall ecological conditions, opportunities, and risks are similar, the Science Integration Team also evaluated existing information and summarized current conditions around "clusters" of subbasins. These "clusters" exhibit similar sets of characteristics, reflecting common management needs, opportunities, risks, and conflicts. It was from this integrated view of integrity that restoration needs and priorities were described and analyzed in the Draft EISs.

In the Supplemental Draft EIS, broad-scale functional (that is, landscape, aquatic, water quality, old forest/rangeland habitat, economic, and tribal) restoration priorities were developed and mapped. Subbasins were identified for broad-scale integrated restoration priority, based on the following: risk to aquatic and terrestrial species and their habitats from natural disturbances; opportunity to reduce those risks, improve habitats, provide the appropriate mix of habitats, and fix succession/disturbance patterns; ability to provide connectivity for and expand scarce aquatic and terrestrial habitats; hydrologic processes; economic value to human communities; and restore other biophysical and/or social needs where opportunities exist. Additional aquatic priority subbasins were included to expand and improve extent, condition, and connectivity of aquatic habitat.

**Comment:** The Draft EISs present incomplete information on ecological integrity ratings (for forest integrity and hydrologic integrity specifically), including how they were calculated and how they are to be interpreted.

**Narrative:** *Some individuals feel that the proxies used for ecological integrity are crude and will likely lead to erroneous characterizations of integrity. These respondents feel that the selection of proxies deserves greater explanation, and that the validity of the proxy selection process needs to be demonstrated. They want an explanation of how composite ecological integrity ratings were calculated and how they are to be interpreted, especially because the composite ratings seem to deviate from the component integrity ratings. These respondents feel that there is no indication that basin hydrology was assessed, and they want the specific hydrology measures and watershed hydrology needs to be addressed. They also point out that 4th-code Hydrologic Unit Codes (HUCs)*

*lack hydrologic integrity ratings on Map 2-44, and they want the missing integrity ratings with an explanation of why they were omitted.*

**Response:** How integrity was defined and measured is summarized in Chapter 2 of the Draft EISs, at the beginning of the section called Integrated Summary of Forestland, Rangeland, and Aquatic Integrity. Because these ratings have not changed, the Supplemental Draft EIS incorporates this information by reference but does not discuss further specific integrity ratings. The effects on ecological integrity can be found in Chapter 4 of both the Draft and Supplemental Draft EISs. Details of how individual and composite integrity ratings were derived are provided in the *Integrated Scientific Assessment* (Quigley, Haynes, and Graham 1996) and the *Landscape Effects Analysis of the SDEIS Alternatives* (Hemstrom et. al 1999).

**Comment:** Definitions of and criteria for delineating forest and range clusters are unclear or misleading and do not accurately reflect important differences in ecosystem integrity within clusters.

**Narrative:** *Some individuals feel that the criteria for delineating forest and range clusters are either in error or they do not clearly distinguish differences among forest- and range-dominated subbasins. Some suggest that the definition of cluster in the glossary and key terms indicates that management opportunities and risks within clusters are similar; they feel that the definition should be revised to indicate that similarities are relative to other clusters and do not reflect the diversity of conditions within clusters that would be revealed by a finer scale analysis. These respondents also feel that the size of clusters should be reduced to enable identification of important differences in ecosystem integrity within clusters.*

**Response:** The concept of range and forest clusters was used for description and analysis in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) and the Draft EISs but was not brought forward to the Supplemental Draft EIS. The clusters have been replaced by Resource Advisory Council and Province Advisory Committee (RAC/PAC) areas in the Supplemental Draft EIS in response to this and similar comments and to be more useful for implementation.

**Comment:** Table 4-31 (Major Trends in Forestland Condition) is unclear and does not describe the relevance of each condition and trend to the decision makers.

**Narrative:** *Some individuals feel that Table 4-31 could be reformatted to make it more understandable. They feel that it seems to present conflicting information.*



**Response:** Trends for forestland terrestrial communities toward or away from historical conditions are presented in a more simplified series of tables in Chapter 4. Table 4-31 is not carried forward into the Supplemental Draft EIS.

**Comment:** The Draft EISs fail to address dry Douglas-fir ecosystems.

**Narrative:** *One respondent asserts that dry Douglas-fir ecosystems, which make up a significant portion of the forested ecosystems in central Idaho, were historically maintained with non-lethal fires, yet there is no mention of managing such forests in the Draft EISs.*

**Response:** Interior Douglas-fir within the dry Douglas-fir type in central Idaho, often take the role of the shade-intolerant species which were historically maintained in open stands by a frequent, light fire regime. Management intent for these sites is similar to ponderosa pine sites where it exists. Management direction in the Draft EISs to “re-establish historical disturbance regimes” and “maintain dry site forests in open stands of large trees” was intended to be applied to the dry Douglas-fir type. Additional language has been added to the Supplemental Draft EIS to further clarify this direction.

## Proposed Management Actions for Forest Health

**Comment:** The Draft EISs do not address how proposed management direction is different from previous management actions.

**Narrative:** *Some commentators expressed concern that “ecosystem management” does not really mean a change from past management practices, because they feel that proposed restoration activities such as logging and control of noxious weeds are the same practices that led to declines in forest health. They question the validity of using past methods to restore forest ecosystem processes.*

**Response:** The major distinctions between the proposed (the action alternatives) and past (the no-action alternatives) management are outlined in Chapter 3 of the Draft EISs, Differences Between the Alternatives and in the Supplemental Draft EIS in Chapter 3, Summary of Alternatives. Although restoration activities under the action alternatives were designed to restore ecosystem health through active management, they are distinct from current/past management in that they use an integrated ecosystem management approach based on sound scientific information.

The consistent, collaborative, science-based direction expected to result from this EIS is different from the previous management approach under which each individual national forest and BLM District made independent management decisions that did not take the broad scale into account.

**Comment:** Assumptions for Table 3-6 (forestlands activity levels) need clarification.

**Narrative:** *Some respondents feel that Table 3-6 is not clear about whether the harvest, thinning, prescribed burning, and watershed restoration acres are overlapping or mutually exclusive, or which category contains timber salvage operations; they want these assumptions to be clarified both in the table and in the alternatives.*

**Response:** Sometimes harvest, thinning, prescribed burning, and watershed restoration are needed on the same acre of forest. Inherently, none of these activities are mutually exclusive. Timber salvage, on the other hand, is a form of harvest and therefore should only be thought of in the context of harvest. Because of this and other similar comments, Table 3-6 has not been brought forward to the Supplemental Draft EIS.

**Comment:** There is disagreement about what forest composition and structure should be and what silvicultural practices should be used to get there.

**Narrative:** *Some individuals suggest that removing primarily smaller trees is not always desirable and that the greatest benefit in terms of forest and ecosystem health may come from removing some larger trees (diseased or genetically inferior) and leaving a stand of well spaced alternate tree species. They feel that increasing early successional, shade-intolerant species does not allow for the development of climax forests where they historically existed. Others say that standard TS-S17 should be revised to provide for conservation of some mid seral species and structures to provide for their transition to late-successional stages.*

*Some feel that silvicultural manipulations should be limited to selective cutting to enhance the return of ponderosa pine and western larch where it has been high graded and reproduction is being crowded by shade-tolerant fir. Others note that tree densities called for in standard PE-S3 seem inconsistent with the desired future conditions to moderate the intensity of disturbances such as windthrow.*

*Some respondents feel that standard TS-S11 is overly restrictive and does not allow for situations where species composition is compatible with the desired range; they think the EIS should add unambiguous qualifiers to the standard to ensure that it is ecologically consistent with the dynamics of the landscape. Some feel that Alternative*



*2 (specifically, Standard A2/AQ-S1) is unacceptable because it prohibits timber harvest in Riparian Conservation Areas and eliminates silviculture as a tool to improve riparian conditions.*

**Response:** The Draft and Supplemental Draft EIS do not provide management direction to remove smaller trees everywhere, increase shade-intolerant species everywhere, or remove all mid seral, multi-story forests. Some alternatives in the Supplemental Draft EIS require these changes where it will help to reestablish more appropriate succession/ disturbance patterns, provide more sustainable vegetation, and increase scarce habitats.

The Supplemental Draft EIS focuses on outcome-based direction. In order to achieve the goals and objectives of the Supplemental Draft EIS, sometimes selective harvest is appropriate while at other times alternative methods of harvest would best achieve the desired outcomes. This decision is best left to the local land manager and collaborating partners to determine fine-scale details.

The snag and coarse woody debris management direction in Alternatives S2 and S3 in the Supplemental Draft EIS has been combined to fix problems of inconsistency between standards in the Draft EISs. It is based on historical conditions so that the direction will not call for higher numbers of snags and amounts of coarse woody debris than the site can sustain.

Several alternatives in the Draft EISs and Supplemental Draft EIS do allow timber harvest in riparian areas when it promotes riparian management objectives. The decision makers will consider many factors, including overall effects on riparian areas, when the selected alternative is identified.

**Comment:** The EIS should make clear which forest clusters are designated for active restoration and which are designated for passive restoration.

**Response:** The concept of range and forest clusters was used for description and analysis in the *Assessment of Ecosystem Components* and the Draft EISs, but was not brought forward in the Supplemental Draft EIS. The clusters have been replaced by Resource Advisory Council and Provincial Advisory Committee (RAC/PAC) areas in response to this and other similar comments.

**Comment:** The EIS should not assign a management emphasis to forests with high ecological integrity.

**Narrative:** *Some respondents argue that lands with high ecological integrity should not be in need of "forest health logging" or other management activities.*

**Response:** In the Supplemental Draft EIS, several areas were identified as being in good condition (high integrity) and/or important to fish or wildlife. Management activities in these areas (A1 and A2 subwatersheds and T watersheds) are somewhat restricted and must be consistent with maintaining or protecting their value as important habitats. Other areas were identified as having lower integrity and in greater need of restoration. This is a different approach than was taken in the Draft EISs.

Ecosystems change through time. In order to maintain an area with high ecological integrity over the long term, it may be necessary at some point to manipulate the vegetation using management techniques that resemble natural processes.

**Comment:** The Draft EISs do not fully address the impacts of grazing in forest clusters; livestock management in forest clusters should be included in Table 3-6 and in the analysis of effects.

**Response:** The concept of range and forest clusters was used for description and analysis in the *Assessment of Ecosystem Components* and the Draft EISs but was not brought forward to the Supplemental Draft EIS. The clusters have been replaced by Resource Advisory Council and Province Advisory Committee (RAC/PAC) areas in the Supplemental Draft EIS in response to this and similar comments and to be more useful for implementation purposes. Table 3-6 is not brought forward into the Supplemental Draft EIS.

**Comment:** Table 4-51 should be revised to include timber harvest activities as a means to restore forest structural stages and species composition and to reduce stand density and fuels.

**Narrative:** *Some people feel that Table 4-51 (Annual Restoration/Management Activities) should include timber harvest as a management activity. They think the EIS should analyze the implementation effects of the alternatives against the following: (1) standards that reallocate suitable timber base, (2) standards or objectives that constrain timber availability across space and time, and (3) processes or constraints that could impede or prohibit attainment of predictable resource outputs.*

**Response:** Setting timber harvest allocations is not addressed through this broad-scale EIS, but would be established at the local level through individual land



use plans. Chapter 4 presents the broad-scale effects but not the mid- or fine-scale effects of the alternatives on timber harvest levels.

**Comment: Forest health guidelines are conflicting, inconsistent, or unclear.**

**Narrative:** *Some respondents feel that guideline TS-G67 may be inconsistent with objective TS-O6 for all alternatives. They note that to convert late-seral stage multi-layered ecosystems to single-layered systems may not be a consistent objective among alternatives and may conflict with other objectives. They feel that guideline TS-G92 is neither consistent nor possible in an action management alternative because large blocks of late seral habitats which represent patterns that occurred with natural disturbance events could include areas the size of individual national forests or larger. For these respondents, guideline TS-G94 suggests that watershed restoration needs determine activity locations and frequencies, but they note that watershed restoration is not defined. They feel that TS-G109 needs a modifier such as "where appropriate" to ensure that sufficient scientific study underlies designation of any ridgetop as "important to linkage or movement of wildlife."*

**Response:** Some inconsistencies among guidelines are not unexpected, because guidelines are optional recommendations for various ways to achieve an objective. It is not expected that all guidelines would be adopted everywhere simultaneously. However, each guideline is intended to be clear and consistent with the objective itself. This has been improved in the Supplemental Draft EIS.

The key term in TS-G67 is "consistent with the biophysical environments and the disturbance regimes." The Draft EIS does not require managers to convert all late seral multi-story forest to single-story forest, but only where it makes ecological sense. TS-G67 is not brought forward to the Supplemental Draft EIS because it is redundant with other management direction.

Natural disturbances create patches and patterns of vegetation on the landscape. These patterns are variable because the landscape conditions are variable and the nature of the disturbances is patchy. Patches of any vegetation type, especially late seral forests, do not encompass an entire national forest or BLM district. The intent of guideline TS-G92 is to build the size of late seral forest so that there is less edge-effect on the interior forest wildlife species that use late seral forest. The term "large blocks" is relative to the way it is used; in relation to the size of most stands of late seral forest, "large blocks" would not be as large as the size of an administrative unit. This guideline was

revised and rewritten in the Supplemental Draft EIS to improve clarity and understanding.

TS-G109 is not brought forward to the Supplemental Draft EIS; however, this issue is addressed through other objectives and standards. The Supplemental Draft EIS concentrates more on restoring and expanding habitats where it is ecologically and biophysically consistent than on physically linking habitats because those linkages may not be sustainable.

**Comment: The Draft EISs incorrectly describe the effects of forest management activities.**

**Narrative:** *Some individuals feel that the Draft EISs incorrectly describe the effects of roads, timber harvest, and other management activities. They claim that improved logging practices and current technology mean that ill effects do not result from these management activities; they feel that theories about negative impacts on the environment are unfounded as demonstrated by looking at "any clearcut or logging unit".*

**Response:** Negative effects from roads, timber harvest and other management activities have been documented in the Draft and Supplemental Draft EISs. Some negative effects can be mitigated through actions such as seasonal road closure, proper engineering and maintenance of roads, winter-season harvests, and maintaining buffer strips near streams. Some of the management direction in the Draft and Supplemental Draft EISs addresses mitigation of effects of resource management activities, including roads and timber harvest; however, many mitigation measures would be better determined on a finer scale by local managers.

**Comment: The EIS should allow for site-specific flexibility in management and restoration of forest health.**

**Narrative:** *One person feels that forest stands should be managed according to the unique requirements of their forest habitat type. Others feel that the plan needs to allow flexibility in managing areas for such site-specific issues such as insect and disease infestations or fuel load.*

**Response:** The Supplemental Draft EIS contains objectives and standards for managing vegetation structure, stand density, species composition, patch size, pattern, and fuel loading and distribution. This would provide for landscape succession/disturbance patterns and terrestrial source habitats that are resilient to disturbances such as wildfire, insects, disease. Site-specific flexibility is built into the



strategy, which provides broad-scale direction to be implemented at the local level. Guidance is provided for "stepping down" the broad-scale information to site-specific conditions.

**Comment:** The EIS should establish a clear policy against clearcutting in restoring forest health.

**Narrative:** *One person argues that clearcutting has a negative impact on forest health by increasing the risk of fire, raising water temperatures and stream siltation, and disturbing fish and wildlife habitat.*

**Response:** Direction in this EIS is of a broad scale. It neither prescribes nor prohibits specific silvicultural practices on specific sites. The desired outcomes are described in the objectives and standards, and it is up to the local manager to determine the appropriate management activity to achieve the desired outcome.

**Comment:** Species habitat requirements should drive forest health standards in the EIS.

**Narrative:** *Some respondents feel that objective TS-O6 is too open-ended and general to evaluate what will really occur on the ground with respect to species habitat requirements.*

**Response:** The Supplemental Draft EIS identifies and maps specific important habitats with intact succession/disturbance patterns. Alternative management strategies are described for these habitats, which include aquatic A1 and A2 subwatersheds and terrestrial T watersheds. Management activities in these areas must be consistent with the objectives and management intent of the area.

**Comment:** The EIS should allow commercial thinning in forest reserves under strict conditions.

**Response:** Although Alternatives S2 and S3 would not designate forest reserves, they do identify A1 and A2 aquatic subwatersheds and terrestrial T watersheds where some management activities would be restricted. Commercial thinning would be allowed in these areas as long as the activity meets the management intent for the area.

## Mature and Old Forest

**Comment:** The Draft EISs do not set standards that would limit the diameter of trees logged for restoration purposes.

**Narrative:** *One respondent asserts that standards are needed to ensure fire-tolerant species and large-diameter trees are not removed from forest stands.*

**Response:** The Supplemental Draft EIS focuses on outcome-based direction. Objectives are provided for forest composition and structure, including increasing the abundance of shade-intolerant (fire-tolerant) species. Standards require maintaining and/or restoring large shade-intolerant trees and snags to be consistent with what is sustainable on the site.

**Comment:** The Draft EISs do not adequately address the long-term management of mature and old-growth forests.

**Narrative:** *Some individuals feel that a lack of standards in the EIS may jeopardize mature and old-growth forests and inadequately protect them from future logging, grazing, and other extractive activities. Alternative 4 in particular is seen as providing significantly less protection for old growth than current interim guidelines. Some people ask for increased protection for these forest types. Some feel that mature and old-growth forests should not be lumped together in management decisions and should be adequately defined in the objectives and standards; lumping old-growth forests in with mature forests is thought to seriously weaken the protection of old-growth forests.*

**Response:** Management options for late seral forests range from passive protection to actively securing them against wildfire, insects, and disease. In the Supplemental Draft EIS, Alternatives S2 and S3 use a short-term approach that combines active and passive management to secure scarce habitat where it exists and increase its geographic extent where it is consistent with the landform, climate, biological, and physical aspects of the ecosystem with an overall objective of preventing further loss of these old forest conditions. In the long term, late seral forests will vary across the landscape as mid seral forests mature and late seral forests are converted to early seral forest through disturbance. Appendix 17a provides specific guidance to managers regarding definitions of old forest.

**Comment:** Management objectives in the EIS should be tied to topographic/landform variations that allow for multi-layered forest structure.

**Narrative:** *One writer asserts that not all old-growth should be managed for single story structure, but that some sites should be left unmanaged to retain multi-story structure.*



**Response:** The Draft EISs and the Supplemental Draft EIS state that all late seral forests should not be managed for single story structure. In general, late seral multi-story forests were historically found in draws, on north slopes, toe slopes, or where there was enough moisture to preclude the frequent low intensity wildfire that maintained single-story structure.

**Comment:** The Draft EISs did not consider the impacts of grazing, road building, and mining on multi-story forests.

**Response:** Broad-scale effects of livestock grazing and road building are disclosed in Chapter 4 of both the Draft EISs and the Supplemental Draft EIS. Effects of the alternatives on ranching, mining, forestry-related, and other jobs are also disclosed in Chapter 4. Effects of mining on multi-story forests is not a broad-scale issue; and therefore, was not addressed in the EIS. Those effects, as well as finer-scale effects of livestock grazing and road building will be addressed in finer-scale analyses, such as land use plan amendments and site-specific environmental analysis.

**Comment:** The EIS should allow flexibility for logging large and old-growth trees.

**Narrative:** *Decisions as to whether or not a tree should be harvested depend on the function of each individual tree, one respondent argues. The key to determining whether an individual tree is functional or not is how silvicultural objectives are defined.*

**Response:** In the short term (10 years), the intent of management direction in the Supplemental Draft EIS is to maintain and prevent loss of old forest, and to actively manage to promote its long-term sustainability. Land managers will strive to promote old forest conditions and protect old forests from both natural and human-caused disturbances (such as harvest and wildfire) because old forests and their associated species are in such short supply. As the amount of old forest increases to desired levels through time, the location of old forest can change. The amount and location of old forest varies over time (within desired limits) because some patches of old forest will be burned, harvested, or otherwise disturbed, while other patches of mid-seral forest mature, developing into old forest.

In the long term, the intent of management direction is to increase the geographic extent of certain forest cover types and/or structural stages, including old forest. The location of old forest patches is not static through time; areas move in and out of having old

forest characteristics, especially in cold and moist forest PVGs where a high proportion of the fire regime consists of stand-replacing fire.

Preventing the loss of old forest might include a "wildland fire use for resource benefit" program, prescribed fire program, removal of ladder fuels and smaller competing trees, a program of wildfire suppression, and conversion of some multi-story to single story forest.

**Comment:** The EIS should include more detailed mapping to develop a basis for old-growth management.

**Narrative:** *One respondent suggests a mapping exercise similar to that conducted by the Sierra Nevada Ecosystem Project, which used remotely sensed change and grid-based field sampling to classify land unit according to their relative degree of old-growth structural character, should be used in the EIS.*

**Response:** Data were not available to map old forests at a fine scale throughout the project area. In lieu of this, the SAG used satellite imagery to develop a model which predicted amounts of old forest at a broad scale. This model has been shown to be accurate at the broad scale for which it was developed. However, when applied at finer scales, the accuracy is diminished substantially.

**Comment:** The EIS should address the dependency of wildlife on old-growth, and the selected alternative should identify adequate mature/old forests to support dependent species. The standard directing development of mature/old forest structural definitions (HA-S5) should be rewritten to include all forest structure stages and their attributes, as well as a scientifically sound definition of mature and old forest structure.

**Narrative:** *Many believe that old-growth forests are a vital element in forest ecosystems and need to be preserved and managed properly for wildlife needs. They argue that the Draft EISs fail to analyze separate old-growth stages and may compromise continuing health for species requiring unique mature/old forest stands. They claim that standard HA-S5 (defining mature and old forest structure) inappropriately defers a fundamental task that should have been performed for this Draft EIS, and that the standard emphasizes mature and old forest structural definitions to the detriment of total forest management. Some assert that none of the alternatives propose a framework to protect and conserve old-growth habitats. They want all patches of old growth protected, even those smaller than 100 acres, because of their value as wildlife habitat.*



**Response:** Discussion of the importance of old forests to wildlife has been improved in the Supplemental Draft EISs, using information from *Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin* (Wisdon et al. in press), which was completed after the Draft EISs were published. In addition, the management direction and intent for managing old forests has been rewritten to be more clear and comprehensive. In the short term (10 years), the intent of management direction in the Supplemental Draft EIS is to maintain and prevent loss of old forest, and to actively manage to promote its long-term sustainability. Preventing the loss of old forest might include a "wildland fire use for resource benefit" program, prescribed fire program, removal of ladder fuels and smaller competing trees, a program of wildfire suppression, and conversion of some multi-story to single story forest. In the long term, the intent is to increase the geographic extent of certain forest cover types and/or structural stages, including old forest.

The Pacific Northwest, Intermountain, and Northern Regions of the Forest Service have developed definitions of old forests. These definitions are available by contacting the project office in Boise or Walla Walla (ask for Appendix 17b). An abbreviated set of definitions can be found in Appendix 17a in Volume 2 of the Supplemental Draft EIS, and on the project's website ([www.icbemp.gov](http://www.icbemp.gov)).

**Comment:** Mature and old-growth vegetation may not be the best vegetation for all riparian areas, and the EIS should reflect this.

**Narrative:** *Some say that mid seral growth is a more desirable vegetation scheme to protect riparian health. They feel that AQ-S8 in Alternative 4 unnecessarily and improperly exposes vegetation management activities in Riparian Conservation Areas (RCAs) to one-size-fits-all direction. These respondents insist that it should not be a goal to move all riparian Zone 2a areas to 'mature and old forest conditions' because they feel that young- and intermediate-aged stands will be better 'adapted to natural disturbance regimes' than mature and old forest conditions. Others suggest that standard AQ-S7 regarding leaving large trees in RCAs should be clarified.*

**Response:** The riparian conservation area management direction in Chapter 3 of the Supplemental Draft EIS has been modified from the Draft EISs to better described the desired outcomes, for example to maintain sustainable forests consistent with disturbance regimes and other environmental factors. This would include mid seral forest conditions if they are outside a sustainable range. Standard AQ-S8 is not carried forward to the Supplemental Draft EIS.

Specific direction to leave large trees in RCAs is not included in either Alternative S2 or S3. However, both alternatives include direction to favor and promote large trees and the intent of the direction is for restoration activities to occur in uplands before riparian areas, in general.

## Rangeland Health

### Restoring Rangeland Health

**Comment:** The Draft EISs do not adequately consider the positive and negative effects of livestock grazing on rangeland health.

**Narrative:** *The majority of comments submitted for rangeland health focused on livestock grazing and its effects on range ecosystem processes, including adverse effects on composition and structure and increased soil temperatures and soil compaction. Many feel that this grazing and rangeland health interaction is inadequately addressed within the Draft EISs.*

*Some respondents say that native grasslands are in need of restoration because of grazing pressure; some seek to eliminate livestock where grazing would prevent or slow attainment of ecosystem health and integrity, or to restrict livestock where substrate, water temperature, and bank stability standards are not met.*

*Others claim these damages are overstated, and that grazing has beneficial effects because it mimics natural functions and promotes management objectives, including wildfire prevention and promotion of silvicultural objectives. Many say that livestock grazing improves habitat for wildlife such as deer and elk, and that it will be impossible to produce more forage while restoring rangeland health.*

**Response:** Historical effects of livestock grazing on rangeland health are discussed in the Rangelands section of Chapter 2 of the Draft EISs. The aquatic and terrestrial sections discuss effects of livestock grazing on riparian and aquatic systems. Chapter 2 of the Draft EISs is a condensed version of what was provided by the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), where livestock grazing was identified as a major factor in the decline of rangeland and riparian ecosystems.

Chapter 2 of the Supplemental Draft EIS further discusses past livestock grazing effects. Positive grazing effects, such as forage conditioning for wildlife, was not emphasized because it is not a significant broad-scale issue. Direction to achieve



maintenance or improvement of healthy, diverse native rangeland, forestland, and riparian/aquatic ecosystems are provided in the Supplemental Draft EIS. This could be done through: adequate cover of plants, litter, and biological crusts to promote infiltration, soil moisture storage and stability, soil surface conditions that support infiltration, and moisture storage, soil and vegetative conditions to support establishment of desirable plants and maintenance of plant vigor, and maintenance or improvement of habitat for terrestrial species. Prescriptive management solutions, such as the number of Animal Unit Months, numbers of livestock, seasons of use, and resource utilization are site-specific decisions that are left up to the local managers who have the knowledge and local information and data to best meet the objectives in the EIS.

**Comment:** Disagreements exist about how much, if any, protection the selected alternative should provide for native plants.

**Narrative:** *Many respondents blame grazing, with associated disturbances, as the primary cause of decline of many plant species throughout the project area, particularly in the upland shrub group. Many feel that without additional actions in combination with Alternative 4, protection for native plant species will not be sufficient. These people believe that Alternatives 4 and 6 will further alter habitat conditions through proposed intensive manipulation and prescribed fire in sage brush communities. A few think that Alternatives 3, 5, and 7 will result in less favorable habitat conditions due to the spread of exotic species, habitat conversion to non-native seedlings, grazing, and changes in fire regime.*

*Many individuals are concerned about seed sources for the various plant species. They emphasize the importance of an alternative that provides refugia for varied plant species within the region. Many people hope that implementation will focus on restoration of species composition and not get "sidelined" by the preferred alternative's emphasis on restoration.*

*According to some respondents, native plant populations are not the final word in ecosystem management. They assert that even weeds can be native plants, and that the project should consider the effects of potential weed management policies on community livelihoods.*

**Response:** A major focus of the EIS is the maintenance and restoration of native plants and native plant communities. The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) identified livestock grazing, and noxious weeds/exotic plant invasions as major factors affecting rangeland health on federal lands managed by the Forest Service and

BLM. Alternative 4 of the Draft EIS identified an active approach to address the grazing and noxious weed concerns, fixing those areas presently not being properly grazed and implement grazing systems that address biotic and physical needs of the ecosystem. Although elimination of grazing may eliminate the problem of improper grazing in those areas where current grazing is not meeting native plant needs, it would not keep the noxious weed invasion from continuing to take over vast amounts of rangelands.

In addition, the increase in fuel loads subsequent to the elimination of grazing would significantly increase wildfire, especially in those areas where wildfire is not a desirable occurrence — such as cheatgrass ranges or areas where Wyoming big sagebrush is not abundant. Further, elimination of grazing would not be consistent with the purpose and need to support economic and/or social needs of people, cultures and communities, and provide sustainable and predictable levels of products and services from lands administered by the Forest Service and BLM. The EIS has focused its direction on outcomes such as healthy, diverse native plant communities. The direction in the Supplemental Draft EIS supports native plant maintenance through objectives and standards in the base level, restoration, and terrestrial T watershed sections. In addition, the Supplemental Draft EIS provides protection of key aquatic and upland habitats through the identification and management of A1 and A2 aquatic subwatersheds, and T terrestrial watersheds. Direction written for these areas emphasizes protection of key habitats protecting native plants from degradation.

**Comment:** Range management objective (TS-O12) is too vague. 'Restore' and 'maintain' are too vague. Reference to PFC and RMOs would be better.

**Response:** The Supplemental Draft EIS has added clarification to the restoration and maintenance of rangeland health in the objectives and standards of the base level, restoration, and terrestrial T watershed sections. Clarification includes discussions of native plants, diversity, cover, fragmentation, patch size, litter, soil moisture storage, soil stability, infiltration, and other indicators of rangeland health.

**Comment:** The EIS should acknowledge that rangelands need fire to remain healthy.

**Narrative:** *Some say that fire is a natural part of healthy ecosystems including many rangelands, and that fire should be a part of range management. Others claim that livestock grazing mimics the impacts of fire with less damage to soils, erosion levels, and riparian areas.*



**Response:** The EIS recognizes the need for restoring historical fire patterns to the rangeland systems. Fire is emphasized in the base level, restoration and terrestrial T watersheds sections of the management direction. However, some rangeland areas — such as those dominated by cheatgrass, or Wyoming big sagebrush areas that are (1) highly susceptible to cheatgrass or noxious weed invasion and (2) relatively scarce in the subbasin or area of consideration — would be significantly damaged from fire. Fire as a disturbance to these areas would increase the presence of undesirable plants or noxious weeds and would potentially eliminate the sagebrush component in areas where sagebrush is critical to terrestrial wildlife species, such as sage grouse. The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) did not identify livestock grazing as a method of resembling (or mimicking) the impacts of fire and did not state that livestock grazing causes less damage to soils, erosion levels, and riparian areas than fire.

**Comment:** Contradictory information regarding current and historical rangeland conditions should be addressed.

**Narrative:** *Some note a discrepancy between the project and BLM data, noting that Map 2-48 in the Eastside Draft EIS shows a low level of rangeland integrity in the area that disagrees with similar data from the BLM Internet web page. According to another respondent, the BLM report is based on scientific inventory data which was collected, and ICBEMP's information was a subjective assessment of range integrity which has no precise definition, no direct measurement and no clearly stated goals or objectives.*

**Response:** A more refined approach regarding rangeland integrity was used in the Supplemental Draft EIS to better portray the condition of rangelands in the project area. This approach used a more comprehensive set of elements that reflected rangeland condition. Terrestrial T watersheds and high restoration priority subbasins were identified using this approach. Inherent in trying to assess rangeland integrity over such a large area as the project area is the use of data that are broad in scope.

Site-specific information from BLM administrative units may not be consistent with the project's broad-scale information. Subbasin Review would be required everywhere on Forest Service- and BLM-administered land within five years under Alternatives S2 and S3, partially so that inconsistencies in data due to scale differences can be identified and adjusted at the appropriate scale.

**Comment:** The Draft EISs do not adequately address adverse effects on rangelands from activities other than livestock grazing.

**Narrative:** *Many feel too much blame for degraded rangeland health is directed toward the rancher, when other factors such as recreation and wild horse impacts go unaddressed.*

**Response:** Localized effects from recreational and wild horse impacts are evident at finer scales. However, at the broad scale, these impacts are insignificant in comparison to the major factors that have affected rangeland health, such as excessive livestock grazing pressure, noxious weeds, and urban and agricultural expansion. The Supplemental Draft EIS focuses on broad-scale issues derived from the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997); finer-scale effects on rangelands will be addressed during finer-scale analyses.

**Comment:** Conflicts between grazing and recreation are poorly addressed in the Draft EISs.

**Narrative:** *A few say the potential conflicts between livestock grazing and recreation are quite large, citing birding, plant and wildlife viewing, photography, hiking, and recreational livestock use as activities with potential for conflict. Others note that rangelands are used by hunters and fishermen, and they preserve much-desired open space for growing residential communities. One individual notes that much recreation takes place where grazing is already prohibited or restricted, such as in and around rivers. On the other hand, some say that people are much more destructive than livestock.*

**Response:** Conflicts between grazing and recreation were not identified as a major issue at the broad scale. Although potential conflicts could be high in particular places between recreation and livestock grazing, the solutions to the conflicts are better addressed at the mid- or fine-scale where specific information and solutions can be used to resolve the issue.

**Comment:** The Draft EISs did not address effects of grazing on wildlife, including: interactions between domestic and wild animals, predation by wolves, effects on predator/prey relations, or conflicts between wild horses and livestock.

**Narrative:** *One writer questions the wisdom of grazing permits (for cattle trucked over 100 miles) in Bear Valley on the Lowman Ranger District in the Boise National*



*Forest, near introduced wolves and the Frank Church Wilderness Area. Some say domestic animals spread disease to wildlife. Some feel that the Draft EISs do not address effects on predator/prey relations involving raptors, coyotes, grouse, turkeys, small rodents, and frogs.*

*Some individuals believe the proposed direction will create problems for corrective wildlife/livestock conflict control efforts. They claim that managing for predators will only lead to increased losses to livestock resources. Some assert that the standards do not define a process to mitigate or arbitrate when conflicts occur.*

*Some respondents feel that the EIS needs to further address the impacts of forage competition between big game and livestock. Some point out the negative effects on forage from increased levels of big game species in the project area from historical levels. They believe that big game populations are far above the capability of the land to sustain a healthy population of these species. Conversely, others view the decline in forage availability relative to the high levels of grazing by domesticated species on Forest Service- and BLM-administered lands.*

**Response:** Livestock/big game interactions were addressed in Chapter 2 of the Draft EISs. Wildlife/livestock conflicts and issues are more appropriately resolved at the mid- or fine-scale because the solutions are best served through collaborative efforts among local entities, including ranchers, state fish and game agencies, the general public, and local Forest Service and BLM managers. Collaboration on such matters is strongly emphasized throughout the Supplemental Draft EIS. The Supplemental Draft EIS includes an objective in the Base Level Direction section in Chapter 3 regarding the interaction of domestic and bighorn sheep on federal lands. In general, the domestic sheep/bighorn sheep disease issue is addressed by existing Forest Service and BLM policy that pursues minimizing such interactions.

**Comment:** The EIS should include reserves that prohibit grazing in all degraded areas.

**Response:** The Draft EISs presented one alternative which essentially would prohibit grazing in reserve areas (Alternative 7). The Supplemental Draft EIS alternatives are outcome-based and do not prescribe or limit uses to meet those management outcomes. Those decisions are left up to the local Forest Service/BLM managers. In general, if the intent, objectives, and standards can be met with livestock grazing or other uses, then the use may continue; but if they cannot be met with the use, then it would be

eliminated or modified through appropriate procedures. The Supplemental Draft EIS has management direction that prioritizes the need to address livestock grazing management if it is a factor causing an area to function at risk. Information from the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) did not indicate at the broad scale that grazing would have to be eliminated from degraded areas to meet objectives.

**Comment:** The EIS should explain criteria for range management emphases.

**Narrative:** *Some believe that more rangelands should be put in the "conserve" category. Some attack the categories themselves, such as Produce/Conserve, saying these categories are broad or meaningless, or that the placing of certain rangelands into certain categories seems arbitrary.*

**Response:** The management categories addressed in the Draft EIS have been dropped, and a revised strategy involving direction for base level, restoration, aquatic A1 and A2 subwatersheds, and terrestrial T watersheds is described in the Supplemental Draft EIS. Additional descriptions have also been added to clarify management intent in areas with a conservation emphasis vs. a restoration emphasis.

## Using Science to Manage Rangeland Health

*See also Use of Science*

**Comment:** The Draft EISs do not properly use available information when formulating alternatives or standards or when determining their effects.

**Narrative:** *Some respondents feel that issues and standards regarding rangelands in particular are misleading because of incomplete or invalid information. They cite as an example page 2-90, paragraph 7 of the Eastside Draft EIS, "Slow to recover rangelands are either dominated by cheatgrass or noxious weeds"; they feel that neither the Draft EIS nor the Assessment of Ecosystem Components (Quigley and Arbelbide 1997) supports this conclusion. Another example cited is page 2-91 of the Eastside Draft EIS, where the text states that dry grasslands make up four percent of the project area, reduced from nine percent historically; the maps on the following pages indicate that this decline is not due to conversion to another type, but that these areas no longer exist as rangeland, or perhaps*



*they are no longer federally owned. The respondents feel that Maps 2-9 (Eastside Draft EIS Forest Potential Vegetation Groups-Historical) and 2-10 (Eastside Draft EIS Forest Potential Vegetation Groups-Current) do not show an expansion of forest into these areas and they request information on the cause of this change in the extent of dry grassland. Other examples allege that scientific data are being directly contradicted.*

**Response:** Because administrative units used many different methods and techniques for data gathering that rendered the data inconsistent and impractical to aggregate across the basin, the Science Integration Team and EIS Team were not able to use fine-scale information. The EIS Team considered and incorporated the findings of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), which addressed all lands in the interior Columbia Basin, regardless of ownership. Management direction in the EIS only applies to Forest Service- and BLM-administered lands.

Some vegetation groups, such as dry grasslands, have changed significantly at the broad scale from historical conditions primarily because of conversion to agriculture and secondarily because of exotic undesirable plant invasion, excessive livestock grazing pressure, and tree or shrub invasion. The Supplemental Draft EIS describes the outcomes that are desired for a healthy rangeland ecosystem. It incorporated the concepts of BLM's *Healthy Rangelands Standards and Guidelines* and has modified alternatives to be consistent with those concepts. The *Assessment of Ecosystem Components* identified that improper grazing of native rangelands, especially dry shrublands, has been detrimental during significant drought conditions when native plants are highly susceptible to degradation.

**Comment:** Grazing should be prohibited or greatly curtailed on all public lands.

**Response:** This proposal is not consistent with the Purpose and Need for the proposed action or the findings in the *Assessment of Ecosystem Components*. Alternative 7, which proposed significant decreases in livestock grazing across the project area, was described and analyzed in the Draft EISs.

**Comment:** A capability and suitability analysis of all public lands for livestock grazing should be included in the EIS. Both suitability and capability should be established before livestock use continues to be authorized.

**Response:** Suitability for livestock grazing on BLM- and Forest Service-administered lands and the proper stocking levels for those suitable lands are determined through the land use planning process for each national forest and BLM resource area. It is outside the scope of the ICBEMP to revisit these decisions.

**Comment:** The conclusion on page 2-89 paragraph 1 of the UCRB Draft EIS is misleading and inaccurate. Ranchers have made adjustments when necessary, and improvement in allotments has been evidenced. The Draft EIS makes no mention of the improvements to allotments made by ranchers and federal agencies.

**Response:** Discussion of improvements in grazing and successful restoration efforts in some riparian areas is provided in UCRB Draft EIS Chapter 2, pages 122-124. Improved rangeland riparian conditions in the Big Cotton Creek watersheds on the Sawtooth National Forest in Idaho are featured on page 2-123. However, additional improvements continue to be needed in order to provide for a balance between the levels of use on Forest Service- and BLM-administered lands and resource protection of the resources over the long term. Both the Draft EISs and the Supplemental Draft EIS contain a section in the Introduction to Chapter 2 discussing the Positive Ecological Trends evident in the project area.

**Comment:** Additional information and clarification are needed for dry grass and dry shrublands.

**Narrative:** *Some respondents dispute the rationale for Objective TS-O15 in the Draft EISs, which states: "Dry grasslands, dry shrublands, and cool shrublands are highly departed in frequency and composition from historical levels and conditions," which they feel is contradicted by BLM ecological status data shown on its Internet web page. They say that evidence is doubtful to support the statement in the Draft EISs that "areas with native large bunch-grasses with sagebrush overstories would not be common across the planning area under Alternatives 3 through 7, but would be much more apparent than under Alternatives 1 and 2."*

*Some people feel that the section on the dry grass potential vegetation group is too general, diminishing the focus of thousands of unique microsites.*

**Response:** Dry grasslands and dry shrublands are described in Chapter 2 of the Draft and Supplemental EISs. Their geographical extent is significantly smaller than it was historically. This is predominantly



due to agricultural and urban expansion but also due to noxious weed and exotic plant invasion. The BLM website discusses only the conditions on public land administered by the BLM, whereas the data used in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) were based on all lands within the assessment area.

Chapter 2 of the Supplemental Draft EIS presents clarification and expanded information on the dry grass and dry shrub potential vegetation groups. Additional base level and restoration direction specific to dry grasslands and dry shrublands is presented in Chapter 3.

**Comment:** The relationship between livestock grazing and western juniper should be clarified and corrected in the EIS.

**Narrative:** *Some people feel that the EIS should acknowledge that livestock and over-grazing have increased juniper encroachment, especially in dry areas. Others question the connection between over-grazing and juniper expansion, and ask if fire exclusion has been considered as a factor. Some feel that juniper is a native species that establishes ecosystems and provides habitat for native wildlife. Many fear that removing juniper from rangelands will only increase the amount of noxious weeds already present.*

**Response:** The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) identifies impacts of livestock grazing, climate, and fire suppression on juniper encroachment. Historically, improper grazing, reduction of fine fuels to burn, active fire suppression policies, and a reduction in the understories of grasses and forbs, which compete with juniper seedlings, have played a major role in juniper encroachment. Management direction in the Supplemental Draft EIS is focused on outcomes that require livestock grazing strategies to protect native plant health, provide litter, support infiltration and other indicators of rangeland health.

Reduction in juniper within those areas where juniper has encroached upon sagebrush and grassland communities because of the lack of fire and/or improper grazing is one of the methods suggested to improve rangeland health. Noxious weed control efforts along with necessary reestablishment of native plant understory species is another method. The Supplemental Draft EIS contains a more in-depth discussion on the sequential activities that may be needed to control noxious weeds and to rehabilitate those areas that would not come back naturally as a result of juniper control. The Supplemental Draft EIS

does not advocate the elimination of juniper on sites where fire did not occur naturally very often.

**Comment:** The EIS should clarify the classification of juniper as a shrub and should correct the costs of juniper control.

**Narrative:** *An individual was concerned about the wording on page 2-98, paragraph 5 of the Eastside Draft EIS, where juniper is classified as a shrub. This respondent also questions the figures shown for range improvement in Alternatives 1 and 2, which are thought to be very low. It is pointed out that using data published in BLM facts and conservative costs for various range improvement projects such as juniper control, pipelines and fences, the range cost for a typical year has been \$350,000–400,000, which is said to be approximately double the \$168,000 shown on the table.*

**Response:** The text of the Supplemental Draft EIS has been modified to clarify that juniper is a tree and not a shrub. The activity level tables have not been carried forward in the Supplemental Draft EIS; however, revised cost levels have been factored in while developing the Supplemental Draft EIS.

**Comment:** The Draft EISs make incorrect statements about grazing.

**Narrative:** *Some individuals say the Draft EISs incorrectly state that excessive grazing has caused ecosystem degradation, and that grazing has contributed to runoff and erosion by causing a decline in understory vegetation. One person says that medusahead was incorrectly identified in the Draft EISs as flammable and therefore calls into question statements about livestock, weeds, and fire. Some challenge the documents' identification of numerous plants as noxious exotics.*

**Response:** The EIS is based on findings in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), which documents impacts of excessive livestock grazing on rangelands. Medusahead is highly flammable when it is dried and cured out in the late summer. The identification of noxious weeds is consistent with the states' (within the interior Columbia River Basin) definitions and noxious weed lists for the project area. Cheatgrass, for example, was not identified as a noxious weed in any of the states so it was not considered a noxious weed. However, it is considered undesirable because of its invasive nature, short life cycle, and high flammability, which changes fire patterns in native sagebrush communities.



**Comment:** The EIS should address the effects of drought on all rangeland systems and plant types, using data and science appropriate to local conditions.

**Narrative:** *Some respondents point to standard T5-S23, addressing effects of drought only on dry shrublands, which they feel is inadequate because they believe all ecosystems are susceptible to drought and are subject to its adverse effects. Others feel that standards to protect dry shrublands from damage the year after drought are inadequate because the timing of the precipitation, rather than the amount, is more critical in growing vegetation. They believe that the Draft EISs fail to show that dry range systems recover more slowly than wetter systems, or that these lands are dominated by noxious weeds.*

*Some respondents note an assumption that grazing would be limited during droughts throughout the planning area, yet the standard limits grazing only in one plant type. They feel that this is inconsistent and undermines the grazing effects analysis.*

**Response:** Standard T5-S23 was not carried forward to the Supplemental Draft EIS. The management direction now requires outcome-based conditions that establish indicators such as vegetative cover, plant litter, infiltration, soil stability, and soil moisture storage. These indicators are required on all rangelands including dry shrublands and are pertinent for drought and non-drought periods. This direction is found in the Base Level and Restoration Management sections of Chapter 3.

**Comment:** The EIS should clarify the statement that, unlike wildlife species, livestock tend to stay in one place.

**Narrative:** *Some people take issue with the statement in the Draft EISs (UCRB page 2-87) that, unlike wildlife species, livestock do not migrate but tend to stay in one place as long as they have food, water, and other needs. They feel that this statement is unscientifically broad and ask "if it were true, why has there been a need for drift fences throughout the history of livestock grazing?"*

**Response:** In general, livestock do stay in one place in comparison to wildlife, as long as they have food, water, and other needs met. But "staying in one place" must be considered more figuratively than literally. Livestock will wander within a given area and therefore fencing is needed to keep them confined. Wildlife, on the other hand, will cover vast expanses of land to meet their needs; this disperses their impact on the landscape.

**Comment:** The statement "Only a few tree species including juniper and lodgepole pine and ponderosa pine are native to grasslands" (Eastside Draft EIS, Summary, page 5) is false and needs to be rewritten. This list does not include all the conifers, let alone the deciduous species.

**Response:** The Summary is intended only to give the reader a basic overview of the information presented in the Draft EISs. A more detailed discussion of the affected environment in relationship to rangeland can be found in Chapter 2.

The Supplemental Draft EIS changes the statement to read "The dry grass PVG includes primarily native grasslands, with lesser amounts of woodlands (dominated by conifers such as ponderosa pine and douglas-fir...). These are intended only to provide examples, not an exhaustive list of species. For complete lists of species, see the *Integrated Scientific Assessment* (Quigley, Haynes, and Graham 1996.)

**Comment:** Paragraph 5 (Eastside Draft EIS, Summary, page 5) which addresses agricultural and urban areas, should be removed or rewritten because these areas are not part of the project.

**Response:** The information presented in this section is given so the reader will have a basic understanding of the current state of resource conditions and the challenges faced by the Forest Service and BLM in managing the lands they administer. The Draft and Supplemental Draft EISs clearly state that "Agricultural, urban...potential vegetation groups are not discussed in detail in this EIS because they are less related to or form extremely small components of Forest Service- or BLM-administered lands in the project area...." However, conversion of rangeland PVGs into agricultural and urban areas, and expansion of those areas, have implications for rangeland habitats on Forest Service- or BLM-administered lands. While the direction in the Supplemental Draft EIS is applicable only to Forest Service- and BLM-administered lands, the National Environmental Policy Act requires federal agencies to consider the cumulative effects from all lands in their analysis.

**Comment:** The EIS should address available grazing acreage, including the potential for longer lasting and larger acreage of forage under forest canopy.



**Response:** The focus of the Supplemental Draft EIS is not to prescribe fine-scale decisions, such as livestock grazing acreage, but to protect those areas of native rangeland plant communities that are relatively intact (see the terrestrial T direction in Chapter 3). For example, the amount of dry shrublands (such as, Wyoming sagebrush plant communities which are adapted to very dry areas) are relatively intact. These areas contain a full expression of the diverse native plants that make up the historical plant community, which is rare in the project area; many other sites have been degraded and dominated by exotic plants, such as cheatgrass, or are well below acceptable conditions.

## Aquatic Health

### Restoring Aquatic Health

**Comment:** The Draft EIS alternatives do not provide for adequate protection and restoration of riparian and aquatic health.

**Narrative:** *Many respondents believe that riparian areas have not been given enough protection in the preferred alternative. Many responses ask that the project "restore and rehabilitate" rivers and streams damaged by past logging, mining, grazing, and road activities. Some people believe that the preferred alternative does not establish clear standards for lands, permits, facilities, and management activities to guarantee protection for aquatic and riparian resources. Some feel that the selected alternative needs to go beyond proper functioning condition (PFC), that time frames should be identified, and that activities should be restricted in areas that do not attain PFC.*

**Response:** The intent of the aquatic-riparian-hydrologic management strategy is to maintain or restore conditions on Forest Service- and BLM-administered lands. Riparian management direction for Alternatives S2 and S3 require new activities and ongoing activities to comply with this intent. In addition, specific subbasins and aquatic A2 subwatersheds are prioritized for restoration.

**Comment:** The Draft EIS alternatives do not provide for adequate protection and restoration of watershed health.

**Narrative:** *Many comments address the need to restore/rehabilitate damaged watersheds (caused by roads, mining, logging, grazing) as the top priority. One response states*

*that the elements of restoration activities were poorly described, making it difficult to estimate costs of restoration activities. Another respondent requests an explanation of watershed restoration management activities so the reader can understand what activities will result from the decisions following this EIS.*

*Another respondent requests that the riparian management objectives (RMOs) and standards in the EIS ensure that the protection and rate of recovery of aquatic and riparian areas are greater than currently required by existing land use plans or interim management direction pursuant to PACFISH or INFISH. This respondent feels that the EIS should be clear that all activities occurring or proposed to occur in riparian areas cannot prevent the attainment of RMOs in order to ensure a recovery rate in these fragile areas that is near the 'natural state of recovery.'*

**Response:** In this Supplemental Draft EIS, integrated restoration priorities, which includes aquatic and water quality resources and important aquatic conservation/restoration areas (A1 and A2 subwatersheds) are identified in Alternatives S2 and S3. Aquatic restoration direction has been revised to address strategic concepts and broad-scale issues.

The intent of the aquatic-riparian-hydrologic management strategy is to maintain or restore conditions on Forest Service- and BLM-administered lands. Riparian management direction for Alternatives S2 and S3 require new activities and ongoing activities to comply with this intent.

Watershed condition indicators (WCIs) are used in Alternatives S2 and S3 instead of riparian management objectives (RMOs). WCIs are an integrated suite of upland, riparian, and instream variables used to establish a baseline of current watershed condition, assess effectiveness of the strategy, and guide management activities.

**Comment:** The EIS should consider the effects of sediment on aquatic health, without blaming logging, grazing, or recreation for erosion/sedimentation that is naturally caused.

**Narrative:** *There is disagreement about how much sediment is natural or tolerable. Some respondents claim that standards AQ-S4, AQ-S12, AQ-S16, and AQ-S45, dealing with sediment, are unclear and should be reexamined. One respondent believes that AQ-S4 is not scientifically supportable, and that exceeding the threshold has not been shown to produce measurable instream effects in the project area. Others view sedimentation in streams as natural, even for areas with no grazing, logging, or roads, and suggest that fish can tolerate a great deal more than*



*scientists claim. (See also Road Construction and Maintenance.)*

**Response:** Recognition of the relationships between current conditions of erosion and sedimentation and past management or land use practices is helpful in understanding the nature and scope of problems and possible solutions. As discussed in Chapter 2, erosion and movement of sediments are natural geologic processes, but their amounts and frequency have been substantially affected by human activities, including logging, grazing, and recreation. Effects of high sediments and turbidity on water quality, channel conditions, riparian health, and fish habitats are analyzed in the EIS. This information is incorporated by reference, and further elaborated, in the Supplemental Draft EIS.

**Comment:** The term 'degradation of riparian' should be clearly defined.

**Narrative:** *A respondent notes that in paragraph 4, page 2-5, of the Eastside Draft EIS, the term "degradation of riparian" is broadly used to describe those changes in riparian areas resulting from geologic progression, ecological succession or regression, and short-term and long-term disturbances whether they are natural humans-caused. The respondent feels that degradation is a misnomer and should be removed from the text or limited to those circumstances where it is accurate.*

**Response:** The definition of "degrade" has been added to the glossary of the Supplemental Draft EIS. It is defined as: Degrade (habitats) - Measurably change a feature at a defined scale in a way that: further reduces habitat quality, where existing conditions meet or are worse than the objective; reduces habitat quality, where existing conditions are better than the objective.

**Comment:** Aquatic and riparian health should be clearly defined.

**Narrative:** *Many respondents question the scientific validity of the methods used to assess aquatic health. They complain that standards and objectives are based on broad data that ignore site-specific circumstances. One respondent feels that meeting the fine sediment RMOs is not enough to be considered 'healthy', and that there must be a plan, as in AQ-S4, to relate fine sediment levels to natural levels.*

**Response:** The Supplemental Draft EIS has added clarification to the restoration and maintenance of aquatic and riparian health in the objectives and

standards for base level, restoration, and aquatic A1 and A2 subwatershed management direction. Clarification includes discussions on fish populations, maintenance of habitat, soil stability, infiltration, and other indicators of aquatic and riparian health. A definition of aquatic-riparian health has been added to the beginning of the Aquatic-Riparian-Hydrologic Component section of Chapter 2.

**Comment:** The terms 'restore' and 'maintain' regarding RCA management should be clearly defined (for example, standard AQ-S56).

**Response:** Management direction in the Supplemental Draft EIS was rewritten to clarify the intent. Expanded discussion on RCA delineation and management can be found in Chapter 3 of the Supplemental Draft EIS.

**Comment:** Private lands, watershed councils, and local comprehensive plans are already taking a multi-agency multi-owner approach to aquatic conservation, and these should be more closely examined in the EIS.

**Response:** The Aquatic Staff of the Science Integration Team prepared a section in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) which includes a review of 15 aquatic conservation strategies or assessments that had been completed between 1991 and 1995. The team noted that in general all strategies were based on similar concepts, identified the same suite of factors and processes as concerns, and proposed mitigation that included essentially the same suite of planning and protective measures. The differences lay primarily in the specifics of what was recommended, the implementation strategy, and the approach.

An aquatic conservation strategy has been incorporated into the development of the alternatives. Direction in Alternatives S2 and S3 is broken down into: the step-down process, which explains how to apply the broad-scale direction and information at finer scales; base level management direction, which is an integrated approach to resource management with an acceptable level of risk to resources across the planning area; restoration direction, which is an integrated approach to restoring degraded ecosystems; and specific objectives, standards, and guidelines for aquatic A2 and A1 subwatersheds and terrestrial T watersheds (see Chapter 3 of the Supplemental Draft EIS). Much of this direction is consistent with local comprehensive plans.



**Comment:** The project should coordinate with the National Marine Fisheries Snake River Recovery Plan.

**Response:** The project staff has met and discussed the draft Snake River Salmon Recovery Plan with the National Marine Fisheries Service, and have been in consultation with the National Marine Fisheries Service throughout the development of the EIS. The project is designed to address resource problems at the broad scale. One of the strategies embedded in the project is a long-term aquatic strategy that will replace the interim management strategies of PACFISH and INFISH. The Draft EIS and Supplemental Draft EIS include several points for interface with the adaptive management approach of the Snake River Salmon Recovery Plan. Most notably, these include the Subbasin Review and Ecosystem Analysis at the Watershed Scale standards and objectives in Chapter 3 of the Supplemental Draft EIS.

**Comment:** The EIS should recognize that riparian areas have a high frequency of invasion by non-native flora and fauna.

**Narrative:** *Some individuals say that the EIS should acknowledge that many lands in Oregon and Washington have experienced major invasion by exotic species in riparian areas.*

**Response:** The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) stated that exotic plant invasion is a factor in the decline of riparian area extent and diversity from historical to current. This trend is documented in Chapter 2 of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) in the section that discusses riparian area condition and trend. This information is reflected in the Supplemental Draft EIS in Chapter 2 (Current Conditions and Trends of Riparian Areas and Wetlands, and Factors of Influence/Noxious Weeds) and in Chapter 3 through objectives and standards on noxious weeds and aquatic-riparian restoration.

**Comment:** The selected alternative should include standard RM-S2, which restricts activities that affect riparian health.

**Response:** Although standard RM-S2 is not brought forward to the Supplemental Draft EIS unchanged, a similar standard for Alternatives S2 and S3 is located in the Base Level section of the management direction in Chapter 3.

## Water Quality and Quantity

**Comment:** The Draft EIS alternatives do not adequately protect water quality or address watershed management issues such as water quality, water yield, restoration, and aquatic habitat quality.

**Narrative:** *Many people believe the following to be significant sources of water pollution: non-point source runoff from farm fields; waste from dairy operations; inadequately treated waste from sewage plants; logging; livestock grazing; and drainage from highways and dams. They feel that buffer zones should be enforced to keep these activities at a distance from riparian areas.*

*Some respondents want a minimum standard to be 'to satisfy the Clean Water Act.' Many feel that the project does not keep water clean, and that an overall regional concept to protect water quality is lacking.*

*Others point to the progress that has been made toward protecting water quality and to new techniques being used to ensure protection. Some feel that stream temperature standards in the Draft EISs are neither realistic nor attainable, because they believe the standards are based on ideal conditions for particular cold water species of fish. They believe these fish can tolerate higher temperatures and still be productive.*

*Several responses address mining as a contributor to contaminated water. They state that mining waste should be cleaned up and prevented from entering riparian or underground water supplies.*

*Many people believe that clear and meaningful requirements (standards) for water management issues are lacking in the Draft EISs. Several people contend that universal aquatic management standards should not be applied across the landscape, because they believe such standards often are too broad and vague and do not allow for on-the-ground adjustments to local conditions and multiple-use goals. Some people feel that many of the water quality related standards are too restrictive.*

**Response:** The management direction in the Supplemental Draft EIS applies only to lands administered by the Forest Service and BLM. Additional management direction for water quality is provided through continued application of the 303(d) protocol. The direction requires the Forest Service and BLM to restore water quality limited waterbodies within their jurisdiction to provide for beneficial use attainment, and to protect and maintain water quality where standards are currently being met or surpassed. The proposed water quality management direction is consistent with the Clean Water Act.



**Comment:** Requiring all management activities to improve water quality (as in standard AQ-S53) will conflict with other management goals.

**Response:** The management direction in the Supplemental Draft EIS emphasizes that water quality will be restored where water quality is threatened or water quality is limited (that is, the 303(d) list). In addition, it is the responsibility of the BLM and Forest Service to protect and maintain water quality in waterbodies that fully support their designated and existing beneficial uses. When management activities are proposed within watersheds containing 303(d) listed waterbodies, the 303(d) protocol ensures restoration of water quality while allowing continuation of activities.

**Comment:** The Draft EIS alternatives do not provide for protection of ground water for private and municipal drinking supplies.

**Response:** Restoration and maintenance of hydrologic processes and prevention of pollution are the main steps to ensuring that water quality will support beneficial uses of water, including drinking water. Restoration objectives and standards in the Water Quality, Aquatic-Riparian-Hydrologic, and Landscape sections are designed to restore hydrologic processes and water quality over the long term. Base level objectives focus on maintaining water quality necessary to support beneficial uses, and on collaborating with state agencies to develop partnerships to maximize efforts for water quality protection and restoration.

**Comment:** The EIS should clarify standard AQ-S52 concerning Outstanding Resource Waters declared by states or tribes.

**Response:** Each state or tribe within the project area is responsible for establishing guidance to identify and designate Outstanding Resource Waters (ORW). When a water body is nominated for ORW designation, the guidance generally provides for interim protection where the waterbody is managed for no degradation to existing water quality. Legal designation of an ORW by a state or tribe must include a formal management plan with EPA-approved standards for proceeding with existing and implementing proposed management activities to ensure water quality is not degraded.

One standard in the Water Quality section of Chapter 3 of the Supplemental Draft EIS addresses ORW. NEPA requires that proposed management direction be consistent with existing federal, state, local, and

other regulations. It would be redundant to establish additional management direction for ORW when federal land management agencies are obligated under the Clean Water Act to comply with individual state's High Quality Water and ORW policies. There are no legally designated ORWs in the project area; however, one waterbody in Oregon and two in Idaho have been proposed or nominated as ORWs.

The Supplemental Draft EIS includes management direction within the Water Quality section of Chapter 3 to maintain water quality necessary to support beneficial uses including healthy riparian, aquatic, and wetland ecosystems.

**Comment:** The EIS should discuss the issue of tribal water quality standards and discuss the interactions of the Confederated Tribes of the Colville Reservation and the Confederated Tribes of the Warm Springs Reservation "treated as states" status for nonpoint source management of the Clean Water Act.

**Response:** A document titled *Forest Service and Bureau of Land Management Protocol for Addressing Clean Water Act Section 303(d) Listed Waters*, is a direct link to the Interior Columbia Basin Ecosystem Management Project, which has as one of its goals the restoration of aquatic resources and watersheds. Built into this protocol is the understanding that tribes have the legal right to implement the Clean Water Act (CWA) on tribal lands, including setting water quality standards. The project acknowledges the importance of coordinating and collaborating with tribes that have implemented the "treated as states" status for nonpoint source management of the CWA such as the Confederated Tribes of the Warm Springs Reservation and others. Management intent and direction referring to this can be found in the Water Quality and Hydrologic Processes section in Chapter 3 of the Supplemental Draft EIS.

**Comment:** Add the phrase 'so that water quality standards are attained' to the end of objective AQ-O13, making it consistent with AQ-S56.

**Response:** The management direction within the Supplemental Draft EIS for Alternatives S2 and S3 includes objectives for maintenance and restoration of water quality to support beneficial uses. Also included is a standard that directs application of a protocol to ensure restoration of water quality where water quality standards are not being met because of land management activities on Forest Service- or BLM- administered lands.



**Comment:** The standards for stream temperature are too strict and should be changed in the EIS.

**Narrative:** *Some respondents state that a standard of 50 degrees Fahrenheit (F) in bull trout habitat is too restrictive; they say that 59 degrees F would be a more appropriate standard.*

**Response:** Stream temperature is an important characteristic of suitable bull trout habitat (Lee et al. 1997). Within the project area, bull trout have repeatedly been associated with the coldest stream reaches (Lee et al. 1997). In the Supplemental Draft EIS, stream temperature has been modified from the Draft EISs for Alternatives S2 and S3. As documented in Chapter 3, an integrated set of aquatic, riparian, and hydrologic measures, referred to as Watershed Condition Indicators, will be used to measure effectiveness of the strategy and guide implementation. These indicators will be developed at a subwatershed or larger geographic scale by a local interdisciplinary team of experts to take into account local environmental variability.

Until Watershed Condition Indicators are developed, the National Marine Fisheries Service and U.S. Fish and Wildlife Service matrices of pathways and indicators will be used as interim measures (Appendix 9). The matrices contain several indicators to assess whether a watershed is functioning, functioning at risk, or functioning at a non-acceptable risk. An indicator that the U.S. Fish and Wildlife Service matrix contains is stream temperature for various bull trout life stages (such as incubation). These stream temperatures are based on information within the scientific literature. Stream temperatures within the matrix may be adjusted for local watersheds given supportive documentation.

**Comment:** The selected alternative should not affect water yield.

**Narrative:** *Some individuals believe that the project proposes to abandon active forest management across the project area, which they feel would result in significant water yield reduction as timber growth continues to exceed harvest. Other individuals feel that timber harvest increases water yield without damaging water quality. Others claim that at least one study (King 1989) conducted in the project area indicates no discernible increases in runoff or peak flows attributable to roads. These respondents want the EIS either to be revised to reflect this uncertainty of roads upon peak flows and water yield or to delete the discussion altogether.*

**Response:** There is no intent to abandon active forest management across the project area. Silvicultural

activities will still occur on lands administered by the Forest Service and BLM. The management intent and objectives for forestlands are described in the Supplemental Draft EIS. The locations, types, and timing of activities needed to meet these objectives will be decided at the local unit (national forest or BLM district.) Given the overall size and complexity of the ecosystem within the project area, significant changes in water yield are unlikely based on the premise that growth would result in an overall net decrease in water yield. The effects of roads on the ecosystem are documented in the Draft EISs and discussed in the Supplemental Draft EIS (Factors of Influence, Chapter 2).

**Comment:** The first sentence of standard AQ-S36 should read: 'For hydroelectric and other surface water development proposals, instream flows and habitat conditions that provide for a balance of recreation opportunities, and restore or maintain riparian resources, favorable conditions of flow, and fish passage, reproduction, and growth shall be required'.

**Response:** The Riparian Conservation Area management direction in Chapter 3 of the Supplemental Draft EIS has been modified from the Draft EIS to better describe desired outcomes. In Alternatives S2 and S3, riparian management direction focuses on outcomes that maintain or restore natural riparian and wetland vegetation characteristics to achieve bank and shore stability, coarse woody debris for physical and biological complexity, thermal regulation, erosion rates, and habitat for riparian and wetland dependent species. New management activities would be conducted only if they achieve these outcomes. For management activities subject to valid existing rights, the Forest Service and BLM would use their existing authorities to mitigate and/or require design features that would contribute to or maintain outcomes. Also, an objective in the Ecosystem Processes and Functions section under the Landscape Component in Chapter 3 describes that management actions should achieve outcomes that sustain hydrologic processes (such as flow and sediment patterns).

## Data and Analysis

**Comment:** Aquatics data, assumptions, and/or analyses are incomplete, inconsistent, and/or inadequate.

**Narrative:** *Many respondents feel that the data and/or analyses for aquatic ecosystems are flawed. Some suggest that the Draft EISs do not demonstrate the scientific need*



*for further restriction of timber management to achieve riparian management objectives. Some respondents feel that the Draft EIS buffer width for controlling sediment delivery is appropriate only for highly erodible granitic soils that comprise less than 10 percent of the area. They believe that research on other types of soils suggest buffer requirements should be from one-half to one-tenth those given in the Draft EISs. Some feel it is inaccurate to claim that riparian habitats are seriously degraded everywhere, are getting worse, and desperately need protection, because riparian degradation for rangelands has been slowed or stopped.*

*Some individuals challenge what they see as other unfounded assumptions, unexplained categories, and broad statements in the Draft EISs, such as: absence of a clear definition of linkage areas; the notion that watershed analysis has sped restoration; unclear explanation of hydrologic integrity; the assumption of a high correlation between roads and impacts to aquatic health; the assumption that Alternative 7 would have the most desirable short-term effects; and others.*

**Response:** The data, assumptions, and analyses in the Supplemental Draft EIS use the best available scientific information. The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), a peer-reviewed scientific document, characterized and described historical and current conditions and trends of the project area and provided information on important processes and structures that maintain ecosystems and supply goods and services. Many findings are broad in nature, appropriate to the large project area. The major findings of the assessment pertaining to Forest Service- and BLM-administered lands were brought forward and are described in Chapter 2 of the Supplemental Draft EIS. These major findings in combination with public scoping and public comment on the Draft EIS, were used to develop management direction contained within Chapter 3 of this EIS.

To ensure consistent application of scientific information, the EIS Team frequently interacted with members of the Science Integration Team and Science Advisory Group in development of the EIS. Project scientists periodically reviewed the EIS to ensure that the EIS Team correctly interpreted and applied scientific concepts, information, and assumptions. The *Assessment of Ecosystem Components* should be consulted if additional data or analyses are desired. Assumptions are in Appendix 16 in the Supplemental Draft EIS.

**Comment:** The Draft EISs do not adequately consider the Klamath Tribe's analysis of the Klamath Basin.

**Response:** The basis for the aquatic information in the EIS is the *Assessment of Ecosystem Components* (Lee et al. 1997). The *Scientific Assessment* did not use the analysis performed by the Klamath Tribe because of the need to use a consistent scale of information and data standards across the project area. However, the aquatic assessment did include the portion of the Klamath Basin within the project area and discloses its aquatic conditions and trends. This was summarized and included in Chapter 2 of the Supplemental Draft EIS. Also, Chapter 4 discloses the effects of the alternatives on aquatic resources in the portion of Klamath Basin included in the project area.

**Comment:** The EIS should not use Natural Heritage databases for decision making.

**Narrative:** *Regarding HA-G18 on page 268 of Appendix 3-2 in the Eastside Draft EIS, some respondents feel that the Natural Heritage Databases are incomplete and selective, and are not the result of comprehensive or statistical survey methods. They feel that these databases do not contain information about most special species where they exist, and do contain obsolete information that can no longer be validated. The respondent feels that these databases should not be used for decision-making.*

**Response:** HA-G18 was not brought forward from the Draft EIS; however, similar direction is included in the Supplemental Draft EIS. These databases are only one source of information, which are widely used by many agencies. It is suggested in Guideline HA-G18 that this information be considered in decision making. The guideline does not direct the databases as the sole source of information to be used or suggest that information in these databases be considered more accurate than other information.

**Comment:** Clarify guideline HA-G19 (Appendix 3-2, page 268) by explaining specifically why a corporate GIS database is needed.

**Response:** This guideline is not brought forward from the Draft EISs. The importance of a corporate GIS database is that common data standards among agencies would provide for more efficient sharing of data.

**Comment:** Streams have not been adequately surveyed to determine which ones require buffers; therefore, the use of buffer zones is unscientific and will not restore aquatic health.

**Narrative:** *Some individuals believe that large-scale approaches result in underestimated and under-surveyed*



*streams in the interior Columbia River Basin, which inhibits effective planning. Some feel that delays in obtaining data and surveying subbasins will result in widespread use of default RMO standards. Others feel that the buffer zones are arbitrary, conflict with management objectives, and provide diminishing returns as the buffers expand.*

**Response:** The Riparian Conservation Area (RCA) delineation in Alternative S2 and S3 has been modified from the Draft EIS and no longer contains a specific width value (such as 300 ft), although the interim default standards in other ways have similarities with some aspects of PACFISH and INFISH. RCA delineation in both alternatives depends on ecological and geomorphic site characteristics such as site potential tree height or extent of riparian vegetation. These characteristics were developed by the EIS Team using the best available science as discussed in Lee et al. (1997) to prevent degradation and improve aquatic and riparian habitat, meeting the purpose and need to restore and maintain ecosystem health and integrity and habitats for endangered and threatened species. Also, RCA widths are designed to protect riparian and aquatic habitats from unforeseen events and to incorporate scientific uncertainties.

Riparian Management Objectives (RMOs), which are numeric values for such things as number of pools and pieces of large wood, are not included in Alternatives S2 and S3. As documented in Chapter 3, an integrated set of aquatic, riparian, and hydrologic measures, Watershed Condition Indicators, will be used to measure effectiveness of the strategy and guide implementation for Alternatives S2 and S3. These indicators will be developed at a subwatershed or larger geographic scale by a local interdisciplinary team of experts to take into account local environmental variability. Until Watershed Condition Indicators are developed, the National Marine Fisheries Service and U.S. Fish and Wildlife Service matrices of pathways and indicators will be used as interim measures (see Appendix 9).

The effects of RCA delineation and management on aquatic habitat is discussed in Chapter 4 of this EIS.

## Key Watersheds and Strongholds

**Comment:** The selected alternative should include identification and protection or restoration of important riparian areas and key watersheds, including detailed goal and objective statements for key aquatic ecosystem components, such as strongholds and refugia.

**Narrative:** *Some people believe that important watersheds that are readily restorable should be protected from new impacts and have the lingering effects of past management restored. However, they feel that the objectives are not supported by clear management standards which prevent activities already known to be incompatible with the attainment of the objectives for priority watersheds. Also, others feel strongly that refugia are needed to restore aquatic health, and that a robust, secure, and well-distributed refuge system is needed, free from long-term negative human impacts.*

**Response:** For Alternatives S2 and S3, aquatic A1 and A2 subwatersheds have been identified to maintain and restore key aquatic and riparian habitat areas, secure a network of connected habitats, and protect important fish populations. Specific standards, objectives, and guidelines for conserving, maintaining, and protecting important fish populations and key aquatic and riparian habitat are included. Much of the management direction was rewritten in the Supplemental Draft EIS to clarify the intent.

## Riparian Conservation Areas and Riparian Management Objectives

**Comment:** Riparian Conservation Area delineation and management, including default standards, are unacceptable and should be fixed in the EIS.

**Narrative:** *The majority of comments for this issue express concern that the 300-foot buffer zone in riparian areas is unreasonable. Some individuals feel a 150-foot buffer would be adequate; others feel that all riparian areas need management to be sustained/healthy; others feel that RCA delineation should be based on the size that provides the greatest protection. They also feel that seeps and springs should be protected as riparian areas and that ranchers should not be allowed to constrain seeps or springs as water troughs.*

*Many respondents fear that EAWS will not take place quickly, and that RCAs will be protected only with strict default standards. Others fear that default standards may fail to account for local conditions, may be inappropriate, and may interfere with management objectives.*

*Some respondents feel that to appreciate the implications of the alternatives, the acreages in Figure 4-50 should be converted to percentages of the entire project area. They feel that the EIS must include a competent analysis of RCA acreage in forested watersheds for each alternative to*



*consider and discuss how other processes and management objectives are affected by RCA delineation and management.*

**Response:** The RCA delineation in Alternative S2 and S3 has been modified from the Draft EIS and no longer contains a specific width value (such as 300 ft), although the interim default standards, in other ways, have similarities with some aspects of PACFISH and INFISH. The RCA delineation in both alternatives is dependent upon ecological and geomorphic site characteristics such as site potential tree height or extent of riparian vegetation. These characteristics were developed by the EIS Team using the best available science as discussed in Lee et al. (1997) to prevent degradation and improve aquatic and riparian habitat and meet the purpose and need to restore and maintain ecosystem health and integrity and habitats for endangered and threatened species. Also, RCA widths are designed to protect riparian and aquatic habitats from unforeseen events and to incorporate scientific uncertainties.

Riparian Conservation Area management direction in Alternative S2 and S3 has been modified from the Draft EIS to focus on achievement of objectives instead of promoting or prohibiting management activities. Management activities that would not maintain existing conditions or lead to improved conditions would be inconsistent with the management direction in Alternatives S2 and S3.

In Chapter 4, the area within RCAs is displayed for each alternative. Values are calculated using broad-scale information on stream miles which tends to under-represent actual stream mileage. Actual acres within RCAs would vary by watershed because of site characteristics used to define these areas (such as landform and site potential tree height). Since the project is broad scale it lacks this site-specific information to display precisely RCA acres. Values displayed in Chapter 4 are meant to provide a relative comparison among alternatives at the broad scale.

**Comment:** The EIS should explain how much harvestable timber will be off limits because of Riparian Management Objectives (RMOs), and it should adjust RMOs and RCAs to allow for appropriate timber management.

**Narrative:** *Many fear that RCAs will prohibit the harvest of a large percentage of harvestable timber and remove most productive lands from the shrinking timber base, hindering management objectives and hurting local economies.*

**Response:** The Socio-economic section in Chapter 4 describes the broad-scale effect of RCA delineation

and management on timber harvest and related socioeconomic consequences. The primary management emphasis of RCAs is conservation and restoration of aquatic and riparian-dependent resources. Under all alternatives, vegetation management may occur within RCAs if it is consistent with maintenance or restoration of riparian structure and function. Also, the intent is to avoid short-term impacts that reduce the riparian area's ability to achieve objectives over the long term. Under Alternatives S2 and S3, RCAs would not be included in the suitable timber base used to calculate allowable sale quantity during land use plan revision.

**Comment:** The EIS should not include uniform basin-wide standards for local features such as stream width, temperature, depth-width ratio, pool frequency, canopy closure, and downed woody debris.

**Narrative:** *Many feel that some standards are unattainable even in Category 1 watersheds. Some feel that local conditions make broad standards impossible or inappropriate. They find stream temperature standards (64 degrees Fahrenheit in some habitats and as low as 48 degrees F in others) particularly inappropriate because they believe these standards are derived from research documenting ideal conditions for particular cold water species, and do not reflect what the fish can tolerate and still be productive (see also Water Quality and Quantity). These respondents feel that many standards are neither realistic nor attainable under either natural or historical conditions in many eastside streams.*

**Response:** The riparian conservation area management direction in Chapter 3 of the Supplemental Draft EIS has been modified from the Draft EIS to better describe desired outcomes. In Alternatives S2 and S3, riparian management direction focuses on outcomes that maintain or restore natural riparian and wetland vegetation characteristics to achieve bank and shore stability, coarse woody debris for physical and biological complexity, thermal regulation, erosion rates, and habitat for riparian- and wetland-dependent species. New management activities would be conducted only if they achieve these outcomes. For management activities subject to valid existing rights, the Forest Service and BLM would use their existing authorities to mitigate and/or require design features that would contribute to or maintain outcomes.

**Comment:** The EIS should include a discussion of negative aquatic effects in Alternative 7.

**Narrative:** *Some respondents contest the statement regarding Riparian Management Objectives in paragraph 2 on page 4-143 (UCRB), which says "implementation of*



*Alternative 7 could result in greater short-term benefits to aquatic resources than Alternatives 2, 3, 4, and 6." They believe that Alternative 7 RMOs are rarely achieved in project area streams even in completely natural circumstances, and that where these unrealistic RMOs are not achieved, management activities necessary for healthy ecosystems will be prohibited.*

**Response:** A new effects analysis was not conducted for Alternatives 1 through 7 from the Draft EISs. Only Alternatives S1, S2, and S3 were analyzed for the Supplemental Draft EIS. Interim Riparian Conservation Area (RCA) criteria for Alternatives S2 and S3 are located in the aquatics section of the base level direction and in the aquatics section of Alternative S1.

**Comment:** The concept of feathering RCAs (in standard AQ-S6) should be clarified.

**Response:** The feathering concept was not brought forward to the Supplemental Draft EIS.

**Comment:** Standard AQ-S6 should be clarified to better protect RCAs.

**Response:** Riparian Conservation Area management direction in Alternative S2 and S3 has been modified from the Draft EISs to better describe management intent and objectives instead of promoting or prohibiting management activities. Management activities that would not maintain existing conditions or lead to improved conditions would be inconsistent with the management direction in Alternatives S2 and S3. Chapter 4 describes the effects of the alternatives on aquatic habitat capacity and aquatic species status and distribution.

**Comment:** The EIS should consider the potential of beaver in attaining riparian management objectives.

**Narrative:** *A few individuals say that the actions of beaver, such as damming streams and creating pools, would mimic restoration efforts. These people say the decline of beaver has had a negative impact on aquatic health.*

**Response:** Riparian Conservation Area management direction in Alternative S2 and S3 has been modified from the Draft EISs to better describe management intent and objectives instead of promoting or prohibiting management activities. Management activities that would maintain existing conditions or lead to improved conditions would be consistent with the management direction in Alternatives S2 and S3.

While beaver play an integral role in the ecosystem, they are only one component of a complex system. Beaver management to restore riparian and aquatic habitats are more appropriately evaluated at local levels, with consideration of local resource conditions and issues.

## Management Actions in Riparian Areas

**Comment:** Effects of management activities (such as grazing, logging, mining) on riparian areas should be addressed more accurately in the EIS.

**Narrative:** *Many respondents feel that management activities are needed in riparian areas to maintain a healthy riparian ecosystem. Some feel that aquatic restoration activities for improving habitat can only be accomplished through riparian vegetation management practices, and that restoration and maintenance of riparian canopy closure should not be a standard under any circumstances. They believe that a lack of management will lead to an unhealthy build-up of flammable fuels, which will lead to catastrophic wildfire in these riparian areas.*

*Some individuals feel riparian areas are capable of supporting resource extraction activities and that there is no information to support the assumption of AQ-S12, "timber management and management for aquatic resources are incompatible in all riparian areas." These respondents state that the damage which was caused from past management activities does not occur today because of improved equipment and technology. They want the alternatives to be evaluated on the basis of existing facts and our current understanding of watershed processes, not on what they feel are pre-conceived 'potential' effects of proposed activities.*

*Some view grazing as an essential part of a healthy watershed ecosystem, while others feel livestock grazing caused damage to dispersed sites along streams, because domestic livestock tend to congregate in these areas. They feel that management activities and agriculture cause erosion and pollution. (See also Rangeland Health.)*

**Response:** The relationship between land management activities and aquatic resources is documented in Lee et al. 1997 and other scientific literature as cited within the *Assessment of Ecosystem Components*. These relationships were used in developing models to analyze the probable effects of the alternatives on aquatic habitat and aquatic species status and distribution. Probability of outcomes for aquatic habitat and aquatic species status and distribution were influenced by alternative management direction and landscape conditions. Broad-scale outcomes and and



causes of outcomes are discussed in the Aquatic-Riparian-Hydrologic Component section of Chapter 4.

**Comment:** Consider modifying the last sentence in guideline AQ-G52 which recommends Forest Service and BLM cooperation with state water quality agencies (Appendix 3-2, page 267), to begin with "Based on the problem assessment or ecosystem analysis...."

**Response:** This guideline was not modified because the Forest Service and BLM have an obligation to provide information from problem assessments or Ecosystem Analysis at the Watershed Scale and to provide water quality information collected at multiple scales that use a variety of analysis techniques.

**Comment:** Guideline TS-G126 which recommends that Forest Service and BLM consider treatment of uplands to mitigate risks to aquatic riparian ecosystems, should be revised to include a rationale for the need for additional riparian risk reduction measures if they can be demonstrated, or the guideline should be deleted.

**Response:** This guideline has been modified to become an objective in the Aquatic-Riparian-Hydrologic Restoration section of Chapter 3 of the Supplemental Draft EIS. This objective states that forest health treatments should occur in upland settings before riparian areas. Proposed treatments within RCAs need to be consistent with RCA objectives and standards designed to maintain or improve existing conditions. Specific restoration treatments in RCAs may be necessary in some instances to restore function and connectivity among streams, floodplains, and riparian areas. For example, in some forested landscapes, thinning and prescribed fire may be necessary to encourage development of large trees. Experience gained from treatment in upland settings can then be applied to RCAs where the primary emphasis is maintenance and restoration of riparian and aquatic functions. In these instances, risks and trade-offs need to be well understood prior to implementation of RCA treatments.

**Comment:** The intent of guideline TS-G128 should be clarified.

**Narrative:** *Some respondents want the EIS to explain the intent of the "useful active management approach" of guideline TS-G128 (which recommends that Forest Service and BLM conduct vegetation management practices in a manner that benefits native aquatic species),*

*so that managers would be better equipped to implement it where appropriate.*

**Response:** Guideline TS-G128 was combined with guideline TS-G127 in the Aquatic-Riparian-Hydrologic Restoration section of Chapter 3 of the Supplemental Draft EIS. Historically, the pattern of productive fish habitats was created and maintained by natural disturbance processes. Disturbance patterns and processes have been altered by past activities within the project area, thus altering productive fish habitats. The intent of the modified guideline is, when designing projects, to consider the role of natural disturbances (type, frequency, extent, and severity) in creating and maintaining productive aquatic habitats. By considering the change in disturbance patterns and processes from historical to current time periods, project type, timing, size, and frequency can be designed to be consistent with or to restore natural disturbance processes or patterns important to the maintenance or restoration of productive fish habitats.

**Comment:** Riparian management in the EIS should consider catastrophic events such as floods.

**Response:** Floods are an ecosystem process that influence aquatic and riparian habitat. Objectives in the Landscape Dynamics Component and Landscape Restoration sections of Chapter 3 address the maintenance and restoration of hydrologic processes which include stream flow regimes. In addition, an identifying characteristic of Riparian Conservation Areas are the 100 year floodplain or floodprone width in all alternatives. Riparian Conservation Area management direction in Alternative S2 and S3 would require consideration of important functions provided by riparian areas during floods such as retention of flood water, sediment filtering, and dissipation of flood water energy.

## Grazing Effects in Riparian Areas

**Comment:** The EIS should more adequately describe the effects of grazing in riparian areas and should discuss limits on livestock grazing and handling activities, such as yarding and transfer, where needed in riparian areas.

**Narrative:** *Numerous individuals consider livestock the prime culprit in damaging riparian health, and they feel that strong measures should be taken to eliminate livestock grazing in riparian areas and mitigate the damage from cattle, sheep, and horses. One individual is unhappy that none of the alternatives keep livestock away from riparian*



*areas to allow them to recover and flourish. One respondent feels standards AQ-S11, AQ-S12 and AQ-S13 regarding grazing and riparian health should be written more clearly to better protect riparian areas.*

*Some demand an end to all high-impact livestock handling in RCAs; others say removing all such activities would be logistically impossible.*

*Very few people responding on this topic feel that Alternative 4 adequately addresses grazing in riparian areas. Many object to Alternative 4's proposed continuation of grazing, even if it is tightly controlled and monitored. Others feel the preferred alternative would eliminate grazing from Forest Service- and BLM- administered lands through stricter standards and closure of additional areas to grazing.*

**Response:** Chapter 2 in the Draft EISs, which is a condensed version of what was provided by the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), discusses the historical effects of livestock grazing on rangelands. Chapter 2 of the Supplemental Draft EIS expands on past livestock grazing impacts, including impacts on riparian areas. Maintenance or improvement of healthy, diverse, riparian/aquatic ecosystems is a focus of the Supplemental Draft EIS. Base level direction addresses the outcomes that are needed to provide a healthy, diverse riparian ecosystem, including: coarse woody debris, summer and winter thermal regulation, proper functioning condition, and source habitats for riparian-dependent species. The Supplemental Draft EIS leaves prescriptive management solutions, such as number of Animal Unit Months, numbers of head of livestock, seasons of use, or whether grazing can occur in riparian areas, up to local administrative units who have the knowledge and local information and data to best meet the management objectives. However, the Supplemental Draft EIS makes it a priority to address livestock grazing management if it is found to be a factor in causing an area to function at risk.

**Comment:** The EIS should recognize that degradation of riparian areas has slowed or stopped.

**Narrative:** *Many assert that changing grazing practices have made this activity less damaging than the Draft EISs suggest.*

**Response:** While in some instances grazing practices have been modified to be less damaging to riparian areas (some of which are acknowledged in Chapter 2), overall at the broad scale, riparian degradation from a variety of sources is still an area of concern. As noted in the *Assessment of Ecosystem Components* (Quigley

and Arbelbide 1997), livestock grazing is a major factor in the decline of riparian ecosystems. Base level direction in Chapter 3 in the Supplemental Draft EIS addresses the need to provide a healthy, diverse riparian ecosystem.

## Minerals and Mining Impacts in Riparian Areas

**Comment:** Mining impacts on riparian health should be minimized.

**Narrative:** *Many respondents on this issue cite a long history of still-unresolved mining pollution in several watersheds. Several say that surface mining activities should be prohibited in RCAs.*

**Response:** Mining activities are authorized by the U.S. Mining Laws (Public Domain Lands) Act of May 10, 1872. It is beyond the authority of the decision makers for this EIS to prohibit surface mining in RCAs. Mining effects on riparian health is more of a fine-scale issue, which is more appropriately addressed during finer-scale environmental analyses.

**Comment:** Conflicts between Riparian Conservation Areas/Riparian Management Objectives and mining rights should be resolved.

**Narrative:** *Some individuals note the rights of claim holders under the 1872 Mining Law. Many mention the need for raw materials, the importance of mining to local economies and national interests, and that mining methods have improved from the more destructive practices historically.*

**Response:** Conflicts between mining rights and RCAs and RMOs is a fine-scale issue, which is more appropriately addressed during finer-scale environmental analyses using site-specific information and considering local resource conditions.

## Recreation Impacts in Riparian Areas

**Comment:** Recreational impacts in riparian areas were not clearly addressed in any of the Draft EIS alternatives.

**Narrative:** *While many respondents to this issue feel that recreation is a low-impact and economically wise use of federal lands, some argue that the Draft EISs understate the impacts of recreation on aquatic health. They note impacts such as recreational livestock use, hunting, fishing, off-road vehicles, boat ramps (which, some say,*



*could conflict with Riparian Management Objectives), hiking and backpacking.*

*Many people feel that the Draft EISs provide little direction for water-oriented recreation. One respondent feels that water-oriented recreational settings are a main attraction on federal lands, and if new policies will limit access to and development of new facilities along stream banks to keep up with citizen demand, then this impact needs to be addressed in the EIS. Some feel that the recreational analysis is unacceptable because they say it provides almost no information on impacts or spatial segregation of impacts, and no measurement of impacts by type. They want the recreation analysis to be completely redone to comply with NEPA.*

**Response:** The Draft and Supplemental Draft EISs do not provide a detailed discussion of the effects of recreational activities in riparian areas because that is a fine-scale issue which is more appropriately addressed during finer-scale environmental analyses. Given the broad scale of the analysis, no changes in recreation use across the basin were projected for the alternatives in the Supplemental Draft EIS; therefore, no change in recreation-related employment or effects on ecosystems were reported. This type of recreation analysis would be more appropriately done during mid- and fine-scale analyses (Subbasin Review, EAWS, land use plan amendment or revision, and/or site-specific NEPA analysis).

**Comment:** Standard AQ-S24 needs to be clarified to ensure that a recreation facility must be constructed or located outside of Riparian Conservation Areas if it will have adverse effects.

**Narrative:** *Some feel that Subbasin Review is used inappropriately in standard AQ-S24, and that AQ-S26 (recreation facilities inside RCAs) and AQ-S27 (interpretive facilities inside RCAs) could require relocation or closing of water use facilities. Rather than having a standard of adverse effects that 'cannot be avoided,' they believe it should say 'cannot be mitigated'.*

**Response:** Management direction for RCAs has been rewritten in the Supplemental Draft EIS to focus more on the objectives or outcomes desired, rather than promoting or prohibiting certain activities. Standards in the Aquatic-Riparian-Hydrologic section of the base level direction for Alternatives S2 and S3 state that new and existing land uses, including recreation facilities, within riparian conservation areas (RCAs) must meet RCA objectives. A standard in Alternative S1 (the no-action alternative) requires that recreation facilities in RCAs do not prevent the attainment of Riparian Management Objectives.

## Fire and Fuels in Riparian Areas

**Comment:** The potential effects of fire and fuels management on riparian health—including standards for fire suppression in protected riparian zones—were not adequately described in the Draft EISs.

**Narrative:** *Some individuals note many possible conflicts between fire/fuels objectives and RMOs. Some say that downed woody debris and wide buffer zones would hinder fire/fuels management and lead to more destructive wildfires. Some individuals cite opposing studies regarding the desirability of timber harvest vs. fire in riparian areas. Some say that standards AQ-S29 and AQ-S30 place other priorities above the priority of watershed protection, except in Alternative 7 where standards are clear and concise, giving watersheds and fish the priority over fire management and fuel suppression actions.*

*Some respondents feel that the Draft EISs do not consistently incorporate considerations of wildfire in discussion of aquatic conditions and effects of the alternative aquatic strategies. They note that the Draft EIS recognizes that control of aquatic problems throughout watersheds may not be possible if riparian areas are left untreated where fuel loads are hazardous, where trees are unnaturally dense, and/or where riparian trees are disease or insect-infested. They want the EIS to be revised to state that unnaturally intense wildfires have recently resulted in extreme effects on aquatic and riparian resources, and that if existing and/or future vegetation hazard is not reduced, adverse effects on aquatic resources will continue to occur (AQ-S29). Furthermore, they think the EIS should evaluate the relative risk to riparian areas and aquatic resources from wildfire impacts vs. management impacts for each alternative.*

*Other respondents feel that the Draft EISs lack standards for use of basic firefighting equipment and techniques (fireline construction, backfire operations, fire breaks, chemical retardants, and water pumping) in riparian areas. They suggest that the preferred alternative specify the use of an aquatic specialist on incident command and rehabilitation teams, questioning why this is required only for Alternative 7. One individual stated that prohibiting the delivery of retardant, foam, or additives to surface waters is going to limit the ability to combat wildfires.*

**Response:** The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) contains a comprehensive discussion of the effects of wildfire on riparian areas and aquatic species. The assessment also discusses the risks and uncertainties associated with active forest management within riparian areas to address altered fire patterns and processes. To



evaluate the risk or relative risk to riparian areas and aquatic resources from wildfire vs. active management impacts would require watershed or site-specific level information because of the large variability of riparian area and aquatic habitat condition across the project area. The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) discusses the risks and uncertainties associated with this issue and provides broad-scale context; however, it is too fine scale to be addressed specifically in the EIS.

In addition, Riparian Conservation Area management direction in Alternatives S2 and S3 was modified to focus on desired outcomes instead of promoting or prohibiting activities. Riparian Conservation Areas are established with the primary management emphasis of conserving and restoring aquatic and riparian-dependent resources. The intent is to avoid short-term impacts that reduce the riparian area's ability to achieve management objectives over the long term. Activities may occur within RCAs if they are consistent with the primary emphasis and intent and comply with management direction. It is recognized that short-term impacts may occur as a result of implementing projects that are deemed desirable and consistent with objectives, but all short-term risks are not categorically acceptable. The decision to take short-term risks needs to be made, to the extent possible, within the context of information generated through the step-down process.

Management direction related to fire suppression and RCAs are included for all alternatives. Fire suppression direction was modified from the Draft EISs to incorporate the use of minimum impact suppression techniques within RCAs unless safety to human life or property is an issue. In Alternatives S2 and S3, delivery of chemical retardant, foam, or additives into surface waters is prohibited unless overriding immediate safety concerns exist, or following a review and recommendation by a Resource Advisor when it is determined that the escaped fire would cause more long-term damage to fish habitats than chemical delivery to surface waters.

Resource Advisors are typically part of the fire suppression organization and are usually local resource specialists familiar with the area. They interact with resource specialists and managers to identify local resource issues during fire suppression activities.

**Comment:** It is unclear why standard AQ-S34, prohibiting burnout or backfire operations in riparian habitat, is not applicable under the preferred alternative.

**Response:** Standard AQ-S34 was not brought forward to the Supplemental Draft EIS. In Alternatives S2 and S3, fire suppression within RCAs would follow minimum impact suppression techniques unless life or property are threatened. This approach requires minimal disturbance within RCAs during fire suppression. Burnout or backfire operations within RCAs are not specifically prohibited in the Supplemental Draft EIS because these suppression techniques maybe viable options to limit an uncharacteristic wildfire. If these operations were prohibited in RCAs it would not be possible to use burn out or backfire techniques anywhere.

## **Toxic Chemicals and Herbicides in Riparian Areas**

**Comment:** The EIS should more clearly address present and potential effects of toxic chemicals and herbicides on riparian areas, including effects of noxious weed management activities involving herbicide use in riparian areas.

**Narrative:** *There is disagreement among respondents regarding the use of herbicides and pesticides as a management tool. Some respondents express concern about the duration of chemical persistence after spraying and the potential for pollution of ground and surface water. Most who address this issue feel the use of chemicals should be a last resort management technique. One individual is concerned that there is no standard prohibiting spraying of insecticides in riparian areas. Another states that control of insects by non-natural means has resulted in short-term problems with residual effects from the insecticide applications. This respondent feels that enhancing the development of native bird populations to remove insects has been the most reasonable approach to solving damaging insects, citing as evidence the Forest Service promotion of research to protect native bird populations.*

**Response:** The use of herbicides and pesticides is a site-specific management tool that could be used to meet the broad-scale management objectives described in Chapter 3 of the EIS. The use of herbicides and pesticides would be addressed through fine-scale analysis documents at the local administrative unit (national forest or BLM district.)

Under Alternatives S2 and S3, management in the project area focuses on preventing noxious weed spread into and within aquatic A1 and A2 subwatersheds and terrestrial T watersheds. Existing and future noxious weed inventory information obtained in these areas, along with "Susceptibility of Vegetation Cover Types" (see Chapter 2), would be



used to identify the best management practices in riparian areas.

### **Lands, Permits, Facilities in Riparian Areas**

**Comment:** New and existing permits should be closely controlled, monitored, and considered for revocation if violations are found.

**Narrative:** *Some respondents feel that the aquatic standard in the preferred alternative (Alternative 4) regarding lands, permits, and facilities would not adequately or clearly ensure that aquatic and riparian resources are not harmed. They believe that the preferred alternative should prohibit issuance of new permits unless it can be shown that water conveyance facilities and other surface water developments do not retard or prevent attainment of RMOs and do not cause adverse impacts to aquatic and riparian resources and beneficial uses. Some think the preferred alternative should require all existing conveyances and diversions on federal land be catalogued; compliance with the mitigation measures be confirmed; cumulative impacts on aquatic and riparian resources be evaluated; and permits for conveyance be modified where detrimental impacts are found and revoked where conditions of the permit have been violated or where valid right to use of the water is not held.*

**Response:** A standard requiring modification, relocation, or discontinuation of existing land uses and management actions, if they prevent attainment of objectives for RCAs or aquatic A1 or A2 subwatersheds, is included in the management direction. A standard in the PACFISH/INFISH section of Alternative S1 requires leases and permits in riparian conservation areas to be issued and adjusted to avoid effects that would be inconsistent with or prevent the attainment of riparian management objectives.

**Comment:** Standard AQ-S43, limiting development, should be strengthened.

**Response:** Standard AQ-S43 has been replaced by new standards in the Riparian Conservation Area section in Chapter 3 of the Supplemental Draft EIS.

**Comment:** Dams in the project area should be removed to promote fishery health.

**Response:** The management of dams that occur off Forest Service- or BLM-administered lands is outside the jurisdiction of the Forest Service and the BLM.

The Army Corps of Engineers and Bureau of Reclamation have federal hydropower authority. However, recognition and consideration were given in the EIS as to how the existence and management of dams affect aquatic health on Forest Service- or BLM-administered lands in the project area. Consideration of these effects and conditions played a role in evaluating the cumulative effects of the alternatives in Chapter 4.

### **Effects of Roads on Riparian Areas**

**Comment:** The potential effects of roads on aquatic health were not adequately described in the Draft EISs.

**Narrative:** *Many respondents believe that roads, road use, and road construction and maintenance contribute to undesirable impacts on aquatic health. Others feel that this allegation is unproven. Some say road density is a less important factor in road health than the quality, design, and mitigation methods of the roads and road building.*

**Response:** The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) contains a comprehensive discussion of effects of past management activities (including roads) on aquatic health. Chapter 2 of the EIS summarizes this information.

The Riparian Conservation Area management direction in Chapter 3 of the Supplemental Draft EIS has been modified from the Draft EISs to better describe the desired outcomes. In Alternatives S2 and S3, the intent of riparian management direction is to maintain or restore natural riparian and wetland vegetation characteristics to achieve bank and shore stability, coarse woody debris for physical and biological complexity, thermal regulation, erosion rates, and habitat for riparian and wetland dependent species.

New management activities, including road construction and maintenance, would be conducted only if they achieve these outcomes. For management activities subject to valid existing rights, the Forest Service and BLM would use their existing authorities to mitigate and/or require design features that would contribute to or maintain outcomes.

Road management direction in the Supplemental Draft EIS is intended to reduce road-related adverse effects in the short term while determining long-term needs and locations in a way that has minimal environmental impact and maintains choices for the future.



# Plants

**Comment:** Uniform and consistent criteria should be used in the EIS to define differences in the vegetative community.

**Narrative:** *One respondent asserts that determination and delineation of vegetative communities can be complicated by the terms used by various disciplines to describe plant ecology. This person claims that the Draft EISs are not consistent with scientific literature.*

**Response:** The Draft and Supplemental Draft EISs are consistent with the scientific literature. Several vegetation classifications were used for the sake of thoroughness since ecologists and wildlife biologists often do not use the same classification systems. Each classification system has strengths and weaknesses. For instance, 'potential vegetation types' stay consistent on a site through time, yet do not tell what vegetation occupies the site at a given time. This system is useful to ecologists. With 'terrestrial communities', classification is based on the current cover type and structural stage, but the cover type/structural stages can and do change over time. This system is useful to wildlife biologists.

**Comment:** The EIS should clarify whether the Climax or the State and Transition model is to be used in determining plant species health.

**Response:** The EIS Team did not attempt to determine plant species health because the EIS is a broad-scale analysis, focusing on ecosystem health and plant species viability from a broad perspective. Therefore, neither the climax nor the state and transition models are being used to determine plant species health. The models are discussed in Chapter 2 of the Supplemental Draft EIS (Factors of Influence) with regard to livestock grazing pressure and its relation to vegetative succession.

## Special Status and Native Plant Species

**Comment:** The EIS should prioritize management of plant species of concern at local or small scales over watershed or landscape scales.

**Narrative:** *Because of the diverse nature of the project area, some feel there is a problem of specific standards being*

*applied to different landscapes. They believe that management decisions regarding plant species of concern should be made on the local level (see also Scale).*

**Response:** Broad-scale management direction regarding conservation strategies and risks and opportunities in these plant communities are covered in the Supplemental Draft EIS. However, management of plant species of concern at local or fine scales is the responsibility of the local (national forest or BLM district) land manager. The objectives and standards in the Supplemental Draft EIS require certain conditions to meet rangeland health needs. "How you get there" is left to the local managers to determine.

**Comment:** The Draft EISs do not adequately address sensitive, rare, or threatened and endangered plants.

**Narrative:** *Many respondents are concerned that inventories are not sufficient to protect different plant communities within the project area. They assert that there would be little change in the overall outcomes for the majority of species under any of the alternatives. Many people believe that since the Draft EISs acknowledge locally endemic plants are difficult to analyze at the broad scale, these species are in danger of extinction. Some feel the Draft EISs fail to address the majority of rare plants that are in trouble because their habitats are disturbed. Others criticize the Draft EISs for not having a table of species considered vulnerable.*

*Some assert that timber harvesting, grazing, and road building could have negative impacts on fungi and endangered plants, such as the tiger lily; they feel that the EIS should address those impacts.*

*Some feel the Draft EISs overemphasize the problems faced by native plants. They say that plants have gone extinct before the coming of humans and will continue to do so after humans are gone.*

**Response:** The Supplemental Draft EIS requires maintenance or improvement of native plant communities. Base level management direction requires conservation strategies and risk and outcomes assessments for these plant communities in the step-down process. However, because of the broad-scale nature of the Supplemental Draft EIS, it does not address management of specific sensitive, rare, or threatened and endangered plants in the interior Columbia River Basin. Both the Forest Service and BLM require local administrative units to address protection and management of sensitive, rare, threatened, or endangered plants.



**Comment:** The Draft EISs do not adequately address microbiotic crusts and non-vascular plants.

**Narrative:** *Some comments address the need to institute long-term research on the effects of livestock grazing and trampling on microbiotic crusts. The general feeling among respondents is that the Draft EISs do not adequately address this issue, and that adequate research has not been completed.*

*Some feel that non-vascular plants have been virtually ignored in all aspects of the Draft EISs, and that the Draft EIS analysis of effects is incomplete without a study of effects on non-vascular plants. A few note that known impacts of forest management on fungi are absent from the Draft EISs; they claim that the documents overlook negative effects on fungi from soil compaction caused by timber harvest, roads, and livestock grazing.*

**Response:** The Supplemental Draft EIS expands on the information regarding microbiotic crusts, but the analysis of the impacts to biological crusts are at a broad scale only. While the science is not conclusive, the majority of evidence shows microbiotic (biological) crusts have an important role in rangeland health, especially for soil stability in some rangeland communities. Other roles include: nutrient cycling, native perennial species establishment, and hindering establishment of exotic undesirable species such as cheatgrass. However, biological crusts and their prevalence on the rangelands are heavily tied to soils. Site-specific soils information is not available for the project area. Therefore, biological crusts are better analyzed at the appropriate mid- or fine-scale where site specific information, such as soils, can be determined. Non-vascular plants, with the exception of biological crust were not emphasized in the *Assessment of Ecosystem Components* or the Draft EISs. These plants are discussed briefly in Chapter 2 of the Supplemental Draft EIS; effects of the alternatives on plants (including non-vascular) and biological crusts are discussed in Chapter 4.

**Comment:** Page 2-38, paragraph 7 of the Eastside Draft EIS, says that two plant species are endangered and two are threatened, which is inconsistent with Chapter 2, page 40, which lists three threatened and one endangered plant for the project area. It is also inconsistent with the Eastside summary which states that two endangered and three threatened plants occur in the project area.

**Response:** Threatened and endangered species lists have been updated and revised for the Supplemental Draft EIS.

## Exotic Plants and Noxious Weeds

**Comment:** The Draft EISs do not adequately address the causes of noxious weeds.

**Narrative:** *Many respondents feel the predominance of noxious weeds is the result of disturbances associated with human activity, such as livestock grazing and mechanized logging, mining, and recreation. One individual criticizes the Draft EISs believing that they do not provide supporting evidence for the statement, "noxious weeds are spreading rapidly, in some cases exponentially, on rangelands in every range cluster," and for not providing specific locations or current acreage for noxious weed infestations. Some feel that the noxious weed issue on forested lands is not addressed.*

*Many people feel none of the alternatives offer a solution to combat weed problems and that noxious weeds will only get worse under all the alternatives, since in their opinion none of the alternatives deal with weed vectors, such as roads, livestock, and the use of prescribed fire and thinning as management tools. Many respondents feel that weed prevention should be emphasized over weed control. Many others favor active management of weeds. Some believe that prescribed fire and grazing by goats and predators will reduce the spread of weeds. Some feel that reserves established for the purpose of site-specific analysis of noxious weed encroachment would offer an opportunity to keep weeds in check at a small scale.*

*Some people feel that if noxious weeds and past management will not allow natural processes on certain lands, the EIS should state this information, admit that rangelands are no longer viable, and let local decision makers use any and all tools to restore health. In the opinion of some, private rangelands are in better shape than federal rangelands, because private citizens will spray herbicides or do whatever else is necessary to keep their land free of weeds.*

*One person argues that weeds have long established themselves in undisturbed territory without the influence of humans. This person asserts that weed invasion is not new, and therefore a hands-off, passive approach to management would be counter-productive.*

**Response:** Noxious weeds are addressed in Chapter 2 of the Draft EIS and the Supplemental Draft EIS based on information from the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997). Site-specific information on noxious weeds was not available from the Forest Service and BLM administrative units. The effects of noxious weeds under the



various alternatives are described in Chapter 4. The Supplemental Draft EIS addresses the recommended approach to noxious weed control which involves both prevention and active measures (see Chapter 3 and Appendix 11).

Success in noxious weed control is tied to effective education and prevention measures along with aggressive control efforts. The Supplemental Draft EIS has established the components for a strategy that incorporates the Forest Service and BLM approaches to noxious weed management. This is different than the integrated weed management program in the Draft EIS. The new strategy focuses on education, prevention, control, and rehabilitation (see Appendix 11).

The *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) and Draft EISs identified passive management as ineffective on noxious weeds.

**Comment:** The Draft EISs did not clearly define noxious weeds and their effects.

**Narrative:** *Many people have questions about what plant species are considered noxious weeds and to what extent they are harmful. Some want a clear definition of a noxious weed. Some complain the Draft EISs portray all non-native plants as bad, and disturbance and abuse by humans as the key factor in the spread of such plants. Some question the severity of the threat by noxious weeds to native flora. They suggest the EIS take another look to determine if noxious weeds can be used beneficially.*

**Response:** Noxious weeds are defined and described in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997), the Draft EISs and the Supplemental Draft EIS. Specific information on noxious weeds that are common or exist in a specific area can be found at the local county extension or Forest Service or BLM office. The effects of noxious weeds and the vegetation types that are susceptible to invasion are explained in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) and Draft EISs. The Supplemental Draft EIS focuses on the maintenance and improvement of the native plant and animal communities throughout the project area; no attempt has been made to address the beneficial use of noxious weeds.

**Comment:** The integrated weed management program in the Draft EISs is incomplete.

**Narrative:** *Some request development of native plant seed resources and alteration or elimination of management activities (grazing, logging) that cause introduction or*

*spread of weeds. Respondents feel that these activities should not be allowed on lands that are at risk for weed invasion. Some people feel that the integrated approach to weed management on all lands has not been proven. They note that weed management is not consistent in areas where land ownership is intermingled.*

**Response:** The Supplemental Draft EIS has established the components for a strategy that incorporates the Forest Service and BLM approaches to noxious weed management. This is different than the integrated weed management program in the Draft EISs. The new strategy focuses on education, prevention, control, and rehabilitation. Noxious weed introductions or spread are caused by recreation, livestock grazing, logging, wildlife (birds and mammals), wind, water (rivers and creeks), mining, and other vectors. Noxious weeds have invaded most types of vegetation and land in the interior Columbia River Basin. The strategy proposed in the EIS would only be required on lands administered by the BLM and Forest Service, but it would be more effective if other landowners also participated.

**Comment:** It is misleading to say that "exotics are common components in most plant communities in this group" (Eastside Draft EIS, page 2-99), without also saying that in many of the communities, exotics make up a very small percentage of the composition.

**Response:** The comment noted is in reference to the discussion on the dry shrublands potential vegetation group (PVG) in the Draft EISs. The Landscape Ecology Assessment (Hann, Jones, Karl, et al. 1997; Table 3.40) documents that invasion and spread of exotic undesirable plants (including noxious weeds) has been a dominant change in the dry shrub PVG. Exotic undesirable plants were shown to be common within most cover types in this PVG.

**Comment:** Table 2-14 is inconsistent because it states in the footnote that cheatgrass and Kentucky bluegrass are "not legally declared noxious," but the table lists these two species as noxious weeds.

**Response:** "Noxious" is a legal classification and not an ecological term. Plants that can exert substantial negative environmental or economic impact can be designated as noxious by various governmental agencies. Noxious weeds are therefore a subset of 'exotic' plants. For brevity in the title of Table 2-14, "Noxious Weed" was used to refer to both legally declared noxious weeds and other exotic undesirable plants that have substantial negative ecological and economic impacts. Those plants that are treated as noxious plants but are not legally declared as such,



are labeled in the table, which is carried into the Supplemental Draft EIS, Chapter 2, Factors of Influence section; the title has been modified to address this concern.

**Comment:** *Table 4-33 should be clarified to indicate how "two percent of terrestrial communities are currently 'exotics'" was determined, and to change the wording to 'exotic weeds'.*

**Response:** Table 4-33 was developed from information provided by the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) and the *Evaluation of EIS Alternatives* (Quigley, Lee, and Arbelbide 1997). The word "exotics" can be confusing. The Supplemental Draft EIS clarifies the intent by differentiating between undesirable and desirable exotic species.

**Comment:** *Any plan for the treatment of noxious weeds in the EIS should start immediately, and how the plan will be funded should be explained.*

**Narrative:** Some respondents assert that any plan to control noxious weeds should be properly funded and implemented. They also believe that five years is too long to wait to begin any plan controlling weeds.

**Response:** The five-year requirement was not brought forward to the Supplemental Draft EIS. The current strategy requires education, prevention, control, and rehabilitation to be implemented immediately. However, noxious weed plans are already in place in most administrative units, and noxious weed control is ongoing. Administrative units should coordinate with other entities (state, county, tribal, and private), and be consistent in their approach for noxious weed control to be most effective. So far, uncoordinated efforts have been ineffective against noxious weeds. (See also *Implementation*.)

## Wildlife

### Management Effects on Wildlife

**Comment:** The EIS should address effects on wildlife from management activities such as grazing, timber harvest, mining, roads, and wild horse management. These effects include: interactions

between domestic and wild animals, predation by wolves, effects on predator/prey relations, range management effects on bird populations and habitat, range management effects on amphibian and reptile populations, and management effects on migration routes for big game species.

**Narrative:** *Many respondents view management practices such as road building, off-road vehicle use, mining, logging, and grazing as harmful to wildlife habitat, and they feel that the Draft EISs do not consider the effects from these activities on wildlife. Others claim that some wildlife populations have flourished because of management activities, and they feel that wildlife can co-exist with operations that support all species, including humans. They dispute the notion that human impacts are necessarily detrimental to wildlife.*

*Some individuals claim that Standard HA-S18 does not call for reducing road densities below thresholds recommended by the Interagency Grizzly Bear Committee. They assert that grizzly bears, wolverines, and American martens all require habitat with road densities below certain thresholds, and that failure to meet these requirements will adversely affect these species.*

*Some suggest there is a lack of discussion by the agencies on the effects of grazing on terrestrial wildlife habitat. They feel that riparian habitat is the most vulnerable to degradation from grazing and they insist on standards and guidelines to protect these areas from grazing practices. Some say domestic animals spread disease to wildlife.*

*Some feel that the ICBEMP direction will create problems for corrective wildlife and livestock conflict control efforts. They feel that ranchers, permittees, and private landowners should be involved in collaborative discussions with the Forest Service and BLM to minimize wildlife and livestock conflicts. Other respondents expressed concerns on specific species, such as declining populations for range-related species (Columbian sharp-tailed grouse and sage grouse) related to management conflicts.*

*Some people contend that safe migration routes are essential for effective management, and that the relocation of grazing allotments out of prime corridor habitat is necessary to reduce elk and deer casualties when they travel through these areas. Some feel that proper conservation measures such as habitat corridors, wildlife reserves, and old-growth preservation are necessary for the long-term viability of wildlife species in light of increasing human use, extraction, and development. Some individuals request that the EIS adequately consider the needs of species displaced from their normal habitats because of management prescriptions. Some feel that adaptive management can be a beneficial tool for species recovery. (See also Domestic/Bighorn Sheep Habitat Conflicts.)*



**Response:** Habitat for terrestrial species (plants and animals) is one of the components of Alternatives S2 and S3 in the Supplemental Draft EIS. Positive and negative effects on wildlife habitat from various management activities are addressed in Chapter 4.

The revised terrestrial habitat strategy provides new or strengthened direction for widely distributed wildlife and plant species identified as being of concern at the broad scale, focusing on adequate habitat with appropriate structure and composition across administrative units. New objectives have been added requiring management activities such as logging, grazing, and mining to be done in a way that maintains and promotes healthy, productive, and diverse plant and animal communities, including considerations of habitat connections and fragmentation. Habitats for wide-ranging carnivores such as lynx and wolverine receive additional direction that focuses on identifying and mapping important wide-ranging carnivore areas, and minimizing or mitigating negative effects on wide-ranging carnivores and their prey.

Alternatives S2 and S3 in the Supplemental Draft EIS include direction to be consistent with conservation strategies and other relevant reports (such as the Interagency Grizzly Bear Committee guidelines). Protection of intact habitats for terrestrial wildlife species of concern at the broad scale which have had the greatest declines in source habitats (Terrestrial Families 1, 2, 4, 11, and 12) is the intent of management in terrestrial T watersheds. One intent of the management direction is to maintain or restore terrestrial source habitats.

Identification of specific sensitive areas is too fine-scale for the Supplemental Draft EIS; however, they will be addressed during Subbasin Review, Ecosystem Analysis at the Watershed Scale, and/or site-specific NEPA analysis, as appropriate. Alternatives S2 and S3 in the Supplemental Draft EIS include direction to develop travel plans that provide for needed public access while maintaining or achieving terrestrial, aquatic and riparian objectives.

**Comment:** The Draft EIS standards for habitat planning are too vague and broad.

**Narrative:** *Many individuals feel that the standards, objectives, and guidelines for habitats in the Draft EISs are inadequate for them to make accurate forecasts about the effectiveness of the alternatives on habitats. Some state that realistic assumptions should be made for the alternatives to meet the stated goals of the plan.*

**Response:** This EIS provides broad-scale direction with desired outcomes described. Effects can not be predicted as precisely as they could be at finer scales. Sections on management intent and rationale, which provide additional clarification of the objectives and standards, have been added to improve understanding of the direction. Additional information on terrestrial vertebrate habitats has been made available from the Science Advisory Group since the release of the Draft EISs. This information was used to develop direction presented in Alternatives S2 and S3 in the Supplemental Draft EIS, and has been incorporated into Chapter 2, as well.

**Comment:** The EIS should provide a scientific explanation based on ecosystem principles for why effects of human access on wildlife species were avoided in this project.

**Narrative:** *One respondent requests an explanation of bullet 4 on page Summary-27 of the Eastside Draft EIS, which claims that "human access and its direct and indirect effects on wildlife species are most appropriately addressed at finer scales."*

**Response:** The effects of human access on wildlife species are discussed in both Chapters 2 and 4 of the Draft EISs. The statement in the summary is correct in that the effects of human access are generally site-specific and can best be addressed with finer scale analyses such as Subbasin Review, EAWS and/or site-specific National Environmental Policy Act analysis.

## Data and Analyses

**Comment:** Paragraph 1 on page 2-43 of the Eastside Draft EIS states that the assessment did not consider the fact that "much of the land surrounding some natural areas also contributes suitable habitat for vertebrate species," which appears to conflict with the statement in Chapter 1, Page 15, Col. 2, Bullet 4, which states that "contributions from private lands were considered as part of the assessment." The discrepancy should be corrected.

**Response:** The two statements are consistent in that they refer to different things. The statement on page 1-15 refers to the Science Integration Team's assessment in general, in which contributions from private lands were considered as part of the overall analysis. The statement on page 2-43 refers specifically to natural areas and an analysis of the size-class



distribution of natural areas. A decision was made not to include areas surrounding natural areas (buffers) in the size-class distribution analysis. In this case the intent is to show effects of natural areas, so the decision to exclude areas is appropriate. For clarification, a statement is also made in paragraph 1 on page 2-43 that it is recognized that the surrounding areas may contribute to a species habitat.

**Comment:** The number of vertebrate species in the project area listed in Table 2-12 (page 2-60, Eastside Draft EIS) conflicts with the number of vertebrates stated in Eastside Summary, Page 4, Paragraph 2, which states that 547 vertebrates are present in the project area. The discrepancy should be corrected.

**Response:** The 547 species includes 79 species of birds which are casual, or accidental visitors, to the project area and were considered in the analysis; they were not included in the Draft EIS Table. The table has been corrected to include these 79 species in the Supplemental Draft EIS (Chapter 2, Terrestrial Species Component).

**Comment:** Inadequate information about the Species Environmental Relationship Model is provided; a literature reference and explanation for the model should be provided.

**Response:** The Species Environmental Relationship Model is composed of databases which include base information on species ecology. The databases were used to cluster species into groups based on key ecological functions and key environmental correlates. The databases are discussed on pages 1527-1529 of *Assessment of Ecosystem Components* (Marcot et al. in Quigley and Arbelbide 1997). Different models are explained and cited in the Supplemental Draft EIS.

**Comment:** Objective HA-O2 regarding support of viable species populations, should be rewritten and EIS should define viability.

**Narrative:** *Some respondents believe that the objective regarding supporting viable populations, contributing to recovery of listed species and supporting productive and diverse plant and animal populations (HA-O2), is vague and overly inclusive. They want the EIS to revise the objective to deal with specific wildlife ecosystem health issues.*

*Some want the EIS to remove the language from HA-O2 that says viability is measured by "recovery" goals set by the U. S. Fish and Wildlife Service or the National Marine*

*Fisheries Service. These respondents believe that the National Forest Management Act and other regulations require an independent judgement of viability and not the simple reference to recovery plan standards that they consider to be inadequate.*

**Response:** Alternatives S2 and S3 in the Supplemental Draft EIS give direction to provide habitat capable of supporting viable populations of plant and animal species. The definition of 'viable population' in HA-O2 has been corrected and is included in the glossary in the Supplemental Draft EIS to read, "A viable population is one that has the estimated numbers and distribution of reproductive individuals to ensure that its continued existence be well distributed in the planning area."

**Comment:** The EIS should reanalyze scientific data on wildlife habitat (including the correlation between bird populations and habitat needs) in support of revised standards for protecting habitats for all species, not just threatened or endangered species.

**Narrative:** *Some individuals question whether the standards and objectives in the Draft EISs are based on accurate science, because they claim that habitat provisions will adversely affect certain wildlife populations. Some think the upland sandpiper, Lewis' woodpecker, olive-sided flycatcher, and the veery should be listed as sensitive species. Another respondent states that recent scientific data indicate the northern goshawk prefers mature forests for foraging, while the scientific conclusions in the Draft EISs suggest mixed forests and openings as preferred goshawk habitat; this suggests to them that forest openings are not favorable for the goshawk and may favor competitors of the bird, so they feel that new effects analyses should be performed. Others state that neotropical migratory birds are not adequately considered in the alternatives.*

*Some people feel that other species will eventually be listed as threatened or endangered, and they insist that standards should be revised with provisions to protect habitat for all viable populations. They warn that failure to address these issues now may lead to higher costs and complicated recovery in the future.*

**Response:** Although restoration of sustainable ecosystems benefits many wildlife species, it may also adversely affect others. For example, some species populations may have increased because of increases in some vegetative types and patterns resulting from fire suppression. However, these habitat increases are not sustainable and eventual disturbances will reduce them, with corresponding adverse effects on the dependent species.



The terrestrial strategy presented in the Supplemental Draft EIS in Alternatives S2 or S3 addresses the needs of wide-ranging wildlife species identified as being of concern at the broad scale. The effects on terrestrial species were reevaluated by the Science Advisory Group based on the best science available and are disclosed in Chapter 4 of the Supplemental Draft EIS. The needs of neotropical migratory birds have been considered in alternative development; however, habitat issues in wintering areas, which are outside the project area, cannot be addressed.

An objective of this project is to reduce the potential for additional listing of species as threatened or endangered by providing direction to meet the broad-scale needs of various species. The listing of species as sensitive is addressed through updates to Forest Service and BLM sensitive species lists, which are outside the scope of this EIS.

**Comment:** The theme of Alternative 7 should be revised to correctly reflect what can be measured scientifically about species viability.

**Narrative:** *Some claim that the statement that Alternative 7 reduces risk to species viability was never adequately evaluated in the Draft EISs. They feel that, therefore, it cannot be concluded that the alternative ever achieves this goal. They want the theme of the alternative to be revised to correctly reflect what the Science Integration Team is capable of measuring with respect to species viability and what distinguishes it from other alternatives.*

**Response:** Alternative 7 was not revised for the Supplemental Draft EIS, although certain components were carried forward into Alternatives S2 and S3. The effects of the alternatives were evaluated using the best scientific information available. Risk to species viability under Alternatives S2 and S3 were evaluated by the Science Advisory Group and are presented in Chapter 4 of the Supplemental Draft EIS.

**Comment:** The legends on Eastside Draft EIS Map 2-7 and Table 2-7 are based on the total number of disjunct species, but the total number is not provided. The EIS should provide the total number for both the map and the table.

**Response:** Map 2-7 and Table 2-7 were not carried forward to the Supplemental Draft EIS.

**Comment:** The process used to determine species viability in the Draft EISs should be redone from an ecosystem management approach.

**Narrative:** *Some people feel that because only certain species were chosen for viability studies, long-term viability for all species in the interior Columbia River Basin will be jeopardized. These respondents state that the standards and objectives need to be developed from an ecosystem approach for all species, and not just a species-specific strategy. Some feel that the viability analyses of the Draft EISs are unproven and unclear, and they charge that the agencies will not be able to estimate the long-term capabilities of the ecosystem regarding wildlife habitat.*

**Response:** The process used to select species for evaluation and the process of evaluation and their limitations are described in the Draft EISs and in the *Evaluation of EIS Alternatives* (Lehmkuhl et al. in Quigley, Lee, and Arbelbide 1997). The expert panel process worked well for the diverse species selected. The process for selection of species to be evaluated and the process of evaluation were further refined between publication of the Draft EISs and preparation of the Supplemental Draft EIS. This refinement is presented in *Source Habitats for Terrestrial Vertebrates of Focus in the interior Columbia Basin* (Wisdom et al. in press), and was used to evaluate the alternatives in the Supplemental Draft EIS.

**Comment:** The guideline related to developing a species response matrix (HA-G20) should be revised to restrict the scope and use of literature searches for documenting species responses to management activities.

**Narrative:** *One respondent says that documented responses of species to management activities (HA-G20) should be specific to the inland Northwest. The respondent further believes that interim species response matrices based on literature searches should not be used for decision-making under guideline HA-G20 without validation. They want the EIS to remove this and other guidelines that suggest management actions without proper scientific validation.*

**Response:** Guideline HA-G20 was not brought forward into the Supplemental Draft EIS.

**Comment:** Guidelines HA-G21 (developing conservation strategies), HA-G23 (using information from multiple ecological scales), HA-G24 (conducting an analysis of connectivity), and HA-G28 (consider impacts to amphibians) are unclear.

**Narrative:** *Some respondents feel that the applicability of guideline HA-G21 to the appropriate Draft EIS alternative should be identified and a definition of 'conservation strategy guide' be provided. They believe that analysis of*



*connectivity as specified under guideline HA-G24 cannot be performed reliably at the watershed scale; they want the guideline to be revised to clarify the procedures for connectivity analysis and also to ensure that the analysis is consistent across scales. Guideline HA-G28, which says to "consider wetland habitat features" is an example of what the respondent thinks is an ambiguous and cryptic guideline because of the word 'consider.'*

**Response:** These four guidelines were not brought forward to the Supplemental Draft EIS. Guidelines are intended as suggestions for managers to consider in meeting objectives and goals. The term 'consider' is intended to reinforce the idea that guidelines are not mandatory. The Guidelines appendix in each of the Draft EISs has been dropped from the Supplemental Draft EIS, and instead guidelines that appear to be relevant and helpful are presented in Chapter 3 along with associated objectives and standards.

## Wildlife Habitat and Viability

**Comment:** The EIS should compare viability of species among the alternatives.

**Narrative:** *Some believe there is little difference between objectives, standards, and guidelines among the alternatives in the Draft EISs with respect to species viability. They believe there is no way to evaluate whether the standards and objectives will achieve the intended differences.*

**Response:** A comparison of effects on viability of species among the alternatives is displayed in the Draft EISs; see the *Terrestrial Species* section of Chapter 4, and Appendix K (UCRB)/4-2 (Eastside). The evaluation of alternatives disclosed in the Draft EISs was based on assumptions described in the Draft EISs. In some cases, the rate of achievement was the biggest difference among alternatives. The viability determinations will be part of the Final EIS and Record of Decision.

**Comment:** The Desired Range of Future Conditions (DRFC) for Alternatives 3 through 7 should be revised to include provision of habitats to maintain viable populations of all species. The EIS should address how DRFCs for species viability will be achieved with current management strategies.

**Narrative:** *Some respondents feel it is inappropriate for the DRFC of Alternative 4 to state that "human activities [will be] at levels that allow most species to be adequately*

*distributed in forest environments," because they feel such a statement is inconsistent with the objective of maintaining viable populations and restoring healthy, productive, diverse populations and communities. Furthermore, they note that one of the DRFCs for terrestrial species habitat with Alternatives 3 through 7 is for habitats to be "suitable to maintain viable populations of listed and sensitive species," but that where habitats are inadequate to support viable populations of a species, the need to list the species will inevitably develop. Therefore, they believe this DRFC should be revised to include provision of habitats to maintain viable populations of all species.*

**Response:** The intent of the Desired Range of Future Conditions for forest wildlife habitat (in the Draft EISs) is to provide for the long-term sustainability of forest-dependent wildlife species. A desired population level or distribution and viable population level are not the same. Management for viable populations of species is a management minimum. In most cases the desired population level is well above this minimum. This concept has been clarified in the Supplemental Draft EIS; however, in the Supplemental Draft EIS, DRFCs are not described in a separate section, rather they have been incorporated into the objectives, management intents, and rationales.

**Comment:** The selected alternative should establish wildlife conservation areas to preserve wildlife habitat in reserves.

**Narrative:** *Many believe that the interior Columbia River Basin has some of the most healthy intact ecosystems left in the country, and they want these areas protected for wildlife habitat by creating wildlife conservation areas and reserves. They insist these areas are vital refugia for species, which they claim would face a crisis under the standards proposed in the Draft EISs. Many believe roadless areas would provide ideal habitat for these reserves because management actions are limited in those areas.*

**Response:** Several alternatives in the Draft EISs and Supplemental Draft EIS provide for areas with emphasis on conservation of wildlife habitat. The Supplemental Draft EIS provides specific management direction for watersheds identified as having intact source habitats for five Families of terrestrial species (for Terrestrial T watersheds).

The intent of terrestrial T watersheds in Alternatives S2 and S3 is to prevent loss of acres of source habitat and prevent decline in habitat condition in the short term (10 years), while facilitating a conservation emphasis with a long-term objective of increasing the source habitat for these areas to provide connectivity within the watershed where possible.



**Comment:** The selected alternative should include corridors and linkages necessary to maintain viable wildlife populations.

**Narrative:** *Many insist that habitat corridors and linkages be incorporated into the standards of the EIS to foster genetic interchange and long-term viability. Some believe that Alternative 7 is the most effective in protecting habitat, and many of these individuals express the need to have standards similar to those proposed for Alternative 7 incorporated into the selected alternative.*

*Other individuals claim that many of the alternatives would not protect portions of habitat that would link terrestrial and aquatic areas. They want guidelines to be strengthened and adaptive management and monitoring be adopted to increase the likelihood of connectivity of habitat for wide-ranging species.*

**Response:** Several alternatives in the Draft EISs and Supplemental Draft EIS provide direction related to maintaining corridors and linkages. For example, in Alternatives S2 and S3 in the Supplemental Draft EIS, the intent of terrestrial T watersheds in the short term (10 years), is a conservation emphasis with a long-term objective to increase the source habitat for these areas to provide connectivity within the watershed where possible.

The Supplemental Draft EIS contains direction that strengthens the consideration of fragmentation and connectivity in providing habitats adequate to support viable populations of plants and animals. The restoration emphasis in Alternatives S2 and S3 should, over time, improve connectivity and reduce fragmentation of habitats. Base level direction is provided for developing broad-scale habitat connectivity and linkages for wide-ranging carnivores and for identifying and mapping existing and potential dispersal corridors for wide-ranging carnivores.

**Comment:** Paragraph 2, page 2-6, of the Eastside Draft EIS should be rewritten to consider that increased fragmentation not only has caused a loss in connectivity between some habitats, but also has increased connectivity among other habitats.

**Response:** The statement in the Draft EIS is correct, since it doesn't state that all populations have been negatively affected. The intent is to manage vegetation so that it is more like historical conditions. However, this could mean that habitats are more or less connected, depending on the vegetation type, and that positive and negative benefits will vary among species. For example, increased connectivity of dense forest may be inhibiting bighorn sheep movement, causing their habitats to be less connected.

**Comment:** The standard regarding known habitat bottlenecks and habitat linkages (HA-S4), is too broad and would be too difficult to interpret and implement. Reference is made to a map of habitat bottlenecks, but the map is not provided. This and other standards that are too ambiguous for consideration should be removed.

**Response:** Standard HA-S4 called for managing identified bottlenecks to reduce the effects. Several objectives in Alternatives S2 and S3 in the Supplemental Draft EIS provide direction relative to habitat linkages and cover the content and intent in HA-S4. As noted in the rationale, the map in question was produced by the Science Integration Team for use in their assessment. It was not included in the Draft EISs and is not cited in the Supplemental Draft EIS.

**Comment:** The EIS should better explain the concept of 'key linkage areas' and state their criteria and assumptions.

**Response:** The discussion of habitat needs of carnivores has been refined and clarified in the Supplemental Draft EIS based on information documented in *Source Habitats for Terrestrial Vertebrates of Focus in the interior Columbia Basin* (Wisdom et al. in press).

**Comment:** The EIS should include basin-wide standards for terrestrial species habitat protection, especially wide-ranging species.

**Narrative:** *Some people believe that adequate wildlife habitat is vital to long-term viability of many species, and they suggest basin-wide management standards to better address wildlife needs. They say that wide-ranging species can benefit from these standards which would be applied throughout the project area. Some people feel there is a lack of information presented in the Draft EISs about species that are wide-ranging and lack a central habitat location. They assert that without this data it is difficult to determine if habitat requirements and desired future conditions will be met.*

**Response:** Several alternatives in the Draft EISs and Supplemental Draft EIS provide basin-wide standards for terrestrial species habitat protection. Alternatives S2 and S3 in the Supplemental Draft EIS include objectives that focus on contributing to health, productivity, and diversity of plant and animal communities through maintenance and protection of habitats. Management direction to protect habitat security for wide-ranging carnivores is also provided. Information documented in *Source Habitats for Terrestrial Vertebrates of Focus in the interior Columbia Basin* (Wisdom et al. in press) has been incorporated into



the Supplemental Draft EIS and provides additional insight into the needs of wide-ranging carnivores. In selecting an alternative to be implemented, the decision makers will consider many factors including overall effects on wildlife species.

**Comment:** The EIS should include a strategy to allow for site-specific analysis of wildlife habitat needs.

**Narrative:** *Some individuals claim that modification of standards should include analyses of species trade-offs in habitat management and should allow Forest Service and BLM administrative units to modify standards based on site-specific analyses for habitat. Some people assert that since habitats throughout the project area are variable, the management prescriptions for habitat management should be site-specific. They feel that blanket-scale approaches may not be suitable for some species and may prove to be detrimental to some populations.*

**Response:** Because this EIS provides broad-scale management direction, the desired outcomes, not specific activities or analyses, are described. It is up to the local land manager to determine the appropriate analyses and activities to meet the desired outcomes. In addition, the Supplemental Draft EIS describes a step-down process to link broad-scale direction and information to site specific projects. A process to modify objectives and standards will be described in the Record of Decision. National Environmental Policy Act requires site-specific analysis and disclosure of effects on affected resources prior to implementing a project.

**Comment:** The EIS should consider the importance of fringe habitats in viability analyses.

**Narrative:** *Some individuals say fringe populations of a species range are vital to maintaining genetic diversity and integrity. Others feel viability studies should be performed from the center of habitat ranges, declaring fringes as habitat areas which are subject to outside influence and have less importance to species viability. They feel that fringe areas contain habitat conditions that are different and may expose wildlife to increases in stress and other negative impacts.*

*Some respondents would like a better understanding of the relative size of fringe environments. They ask that the EIS provide quantitative estimates for several species on the percent of the entire distributional range that is composed of fringe environment.*

**Response:** The range of a species is considered in analysis of effects in the Draft EISs and Supplemental

Draft EIS. The primary reason for this, from an ecological view, is that fringe areas may be important to genetic diversity and maintenance of populations in the event of unpredicted events and changing environmental conditions. Currently, it is not possible to provide quantitative estimates of the percent of the entire distributional range of a species which is composed of fringe environments.

**Comment:** Patch size in standard HA-S2 should be more clearly defined as referring to unharvested, unthinned habitats.

**Narrative:** *Some respondents are concerned about the non-specific nature of the direction to increase patch sizes in HA-S2. Some claim landscape connectivity can be affected by patch size, and that inner patch distances should be smaller because large patches are catalysts for high intensity wildfires. They believe that restorative treatments should be applied inside reserves to bring back natural patch sizes. Some recommend more clearly defined standards and guidelines regarding patch size.*

**Response:** The intent of HA-S2 was to provide for sustainable ecosystems. Defined patch sizes are not specified because patch sizes should vary considerably by vegetation type, which is best determined through finer scale analysis (such as Subbasin Review, Ecosystems Analysis at the Watershed Scale). HA-S2 was not carried forward to the Supplemental Draft EIS.

**Comment:** Delete the standard related to providing adequate distribution, occurrence, and connectivity of mature/old forest stands.

**Narrative:** *One respondent feels that HA-S6 is a one-size-fits-all standard for mature and old-growth connectivity which is inappropriately focused on static, steady-state management of forest structure, and would conflict with other structural management goals. Another feels that HA-S6 is an example of a non-sustainable standard, and that the habitat needs of dry forests need to be integrated with the Desired Seral Stages in Table 3-2.*

**Response:** Standard HA-S6 was not carried forward to the Supplemental Draft EIS. A base level objective in Alternatives S2 and S3, in the Terrestrial Source Habitat Component section, is to maintain old forest patch sizes consistent with the landform, climate, and biological and physical conditions of the ecosystem in the short term (10 years). The objective further requires active management to sustain this relatively scarce habitat in the long term, recognizing that the location of patches of old forest are not static and that areas move in and out of having old forest character-



istics, especially in cold and moist forest potential vegetation groups, where a high proportion of fire is stand-replacing. Therefore, active management, such as prescribed fire or stewardship thinning may be required to promote the long-term sustainability of old forest stands.

**Comment: Delete standard HA-S7 (snag retention).**

**Narrative:** *One respondent says HA-S7 is internally inconsistent because on one hand, it states that vegetation actions are to be delayed until administrative units "review existing or conduct new local snag analysis," while on the other hand, in the absence of analysis, default standards are to be used. They want this standard to be removed because they believe it causes unnecessary implementation delays and analysis.*

**Response:** Standard HA-S7 from the Draft EISs was not intended to require another level of analysis, but to include snags in site-specific NEPA analysis that occurs prior to vegetation management activity. Nonetheless, in the Supplemental Draft EIS, standards for snags have been refined and integrated with standards for coarse woody debris to clarify the management strategy to maintain or restore these vital ecosystem elements.

## Special Status Species

**Comment:** The selected alternative should set standards that will protect threatened, endangered, and sensitive species habitat and ensure species viability in compliance with the Endangered Species Act.

**Narrative:** *Many commenting on this issue claim that the standards and objectives in the Draft EISs do not address adequately the needs of threatened, endangered, and sensitive species. They want management direction to be rewritten to ensure species viability.*

*Some find that the Draft EISs do not adequately discuss population goals, habitat requirements, or other information important to the recovery of listed species. Some people feel the project should not adopt the same strategy for sensitive and rare species as for threatened and endangered ones. Some feel that regionally and locally protected species should also be included in the standards. Respondents mention grizzly bears, wolves, martens, lynx, wolverines, and fishers among the species they feel need special attention and are threatened by cumulative effects of management activities such as logging and road building.*

*Many feel that habitat planning in the Draft EISs for threatened, endangered and sensitive species does not comply with Endangered Species Act (ESA) because the documents disclose that several wildlife species may experience poor conditions for viability and there is a high probability that some species will become extirpated. Some contend that although the ESA requires the project staff to consult with other agencies with regard to species management, the Forest Service and BLM need not, and should not, incorporate ecosystem management principles in their management planning.*

*One individual suggests a programmatic way of dealing with ESA issues by involving two levels of consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service, one at the regional level, and another at the Forest or BLM District plan level. They believe that further consultation would be required only if project decisions digress from the selected alternative standards. Others believe that the agencies are wasting time and money on ineffective plans for certain species, when management decisions could take practical steps to reduce listings in the first place. They believe that without the certainty of an acceptable plan there will be more ESA listings and a continuing loss of flexibility.*

**Response:** The Forest Service and BLM have legal responsibilities and policy requirements to provide habitat for threatened, endangered, proposed, candidate, and sensitive species, and species of special interest to tribes. Meeting these responsibilities includes restoration of degraded habitats and maintenance of high quality habitat necessary for the recovery of these species.

Management direction that addresses or affects wide-ranging species listed or proposed for listing under the Endangered Species Act (TEP species) is embedded within the integrated ecosystem management strategy described in the Draft EISs and Supplemental Draft EIS. Portions of the strategy are specific to these TEP species; other portions for forest, rangeland, aquatic, and riparian health contain direction not directly for the species, but which would enhance their protection. Specific management direction in the Supplemental Draft EIS would add to the foundation of existing law, regulation, and direction for threatened and endangered species.

Management direction relevant to TEP species includes Ecosystem Analysis at the Watershed Scale (EAWS) and subbasin review direction, landscape considerations, direction regarding snags, direction for aquatic and terrestrial habitats, specific direction for aquatic and terrestrial TEP areas, and direction



related to road management. In addition, there are often other documents (recovery plans or conservation strategies) that relate directly to recovery of threatened or endangered species. Direction related to these plans is included in some alternatives in the Draft and Supplemental Draft EISs. In other cases the species occur in very localized areas and it is more appropriate for them to be addressed at finer scales (such as subbasin review, Ecosystem Analysis at the Watershed Scale, and/or site-specific National Environmental Policy Act analysis).

It is Forest Service and BLM policy to manage habitat to prevent the listing of species. Regionally and locally rare species would be addressed at the scale most appropriate to their needs. Alternatives S2 and S3 in the Supplemental Draft EIS provide direction related to rare species.

**Comment:** The selected alternative should incorporate clear and detailed objectives and standards for threatened and endangered species to promote collaborative efforts with state and other federal agencies.

**Narrative:** *Individuals are concerned that the Draft EISs lack the specificity necessary to complete meaningful collaboration and Section 7 consultation under the Endangered Species Act.*

**Response:** Increased collaboration is addressed in several objectives and standards in alternatives in the Draft EISs and Supplemental Draft EIS. Currently a streamlined consultation process is in use by National Marine Fisheries Service, U.S. Fish and Wildlife Service, the Forest Service, and the BLM, as outlined in a Memorandum of Understanding. Changes to the consultation process are under the purview of the U.S. Fish and Wildlife Service or National Marine Fisheries Service as outlined in Section 7 of the Endangered Species Act.

**Comment:** The EIS should analyze and address protection of species of special interest to states and tribes, including the protection of big game species such as deer and elk.

**Narrative:** *Noting that not all species of concern to states and tribes are identified through the listing process under the Endangered Species Act, some respondents would like to see emphasis in the EIS for species of special interest to these entities, such as deer and elk. They feel this can be accomplished by incorporating additional standards for these species' protection. (See also Relationship to Other Planning Processes.)*

**Response:** Specific direction is provided in some alternatives in the Draft EISs and Supplemental Draft EIS for certain groups of species that have been identified as being of concern at the broad scale, including threatened, endangered, and proposed species; wide-ranging carnivores; and other widely distributed species. Emphasis is given to habitats rather than populations of these species, because only management of habitat is within the responsibility of the Forest Service and BLM.

Some species of interest to tribes and states were not included in the initial analysis because they are common and their habitat is not decreasing; therefore, no change in direction is needed. The Supplemental Draft EIS discloses the effects of the alternatives on the harvestability of wide-ranging aquatic and terrestrial species and riparian-dependent species to meet the needs of the American public in general, in addition to meeting federal trust responsibilities to American Indian tribes. These federal trust responsibilities include tribal access to traditionally harvested plants, deer, elk, grouse, and other game species. Some terrestrial plant and animal species have limited ranges and require site-specific information so only general effects are disclosed in this broad-scale EIS.

The Terrestrial and Aquatic Species section of Chapter 3 of the Supplemental Draft EIS contains management intent and direction on three specific areas for terrestrial and aquatic species habitats: (1) providing for conservation of basin-wide species of concern; (2) providing quality habitat to support harvestability, which is important to both tribes and states; and (3) providing for terrestrial and aquatic species habitats which are not addressed by source habitats or with other direction (such as species with special habitat needs).

**Comment:** Standards and objectives in the EIS should identify habitat recovery plan requirements.

**Narrative:** *While standard HA-S14 identifies the need to implement recovery plans, some respondents are confused about exactly what constitutes a recovery plan. They request that the EIS identify what a habitat recovery plan contains.*

**Response:** A 'recovery plan' is defined in the glossary of the Draft EISs and Supplemental Draft EIS as a plan that identifies, justifies, and schedules the research and management actions necessary to reverse the decline of a species and ensure its long-term survival. Direction in several alternatives in the Draft EISs and Supplemental Draft EIS tiers to recovery plans, conservation strategies, and similar documents. Alternative S2, the preferred alternative,



requires management actions to be consistent with approved recovery plans. Recovery plans are prepared by the U.S. Fish and Wildlife Service and National Marine Fisheries Service in accordance with the Endangered Species Act; they are individually designed to meet the needs of a particular listed species. Further details about recovery plans may be obtained from the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

Standards brought forward from the Draft EIS have been refined, rewritten, and streamlined throughout Chapter 3 of the Supplemental Draft EIS to improve clarity and understanding.

**Comment:** The selected alternative should not encourage reintroduction of endangered species, because of the effects of reintroduction of grizzly bears and wolves on humans and other species.

**Narrative:** *A number of respondents perceive reintroduction programs to be an infringement on their ability to use their lands as they desire. In particular, they see the wolf reintroduction program as an example of a counter-productive effort that interferes with good resource management on both public and private lands. Some people contend that the agencies are placing grizzly bear needs over human needs in management decisions. Some respondents assert that the resource needs of humans and wildlife are incompatible. Their concern is that the direction they perceive in the Draft EISs will overemphasize the protection of certain wildlife species (such as wolves, grizzly bears, mountain lions and other predators) over human safety, making the lands unsafe for recreationists, workers, and livestock. They feel that the agencies should not promote these measures of reintroduction.*

**Response:** Reintroduction of species under the Endangered Species Act is under the authority and supervision of the U.S. Fish and Wildlife Service and National Marine Fisheries Service. Direction in the Draft EISs and Supplemental Draft EIS is intended to be consistent with recovery efforts as required by the law.

**Comment:** The range of certain threatened and endangered species should be corrected in the EIS.

**Narrative:** *Some people find it misleading for the Draft EISs to state that the project area is the southern portion of some larger carnivores' range, because they claim that grizzly bears, wolves, and lynx once ranged much farther south.*

**Response:** Some species, such as the grizzly bear and the gray wolf, were historically more widely distrib-

uted. For others, such as the lynx, the project area does represent the southern portion of its range. The Supplemental Draft EIS has been modified to clarify and simplify this discussion.

## Birds

**Comment:** The selected alternative should provide adequate protection for bird species.

**Narrative:** *Some individuals feel that the Draft EIS standards and objectives will not provide adequate protection for bird habitat and foraging grounds. Some request that basin-wide standards be incorporated into the EIS. They feel that the agencies need to fully evaluate the impacts of the selected alternative on bird populations and habitat, stating that the BLM and Forest Service fail to incorporate many of their own scientific findings in the standards. Others conclude that site-specific analysis is a more proper way to address habitat management, because of changing and diverse land conditions in the interior Columbia River Basin.*

**Response:** Several alternatives in the Draft EISs and Supplemental Draft EIS provide basin-wide objectives and standards for protecting, restoring, and maintaining wildlife habitat. Additional direction is provided for special habitat features to be protected, including some used by birds. Effects of the alternatives on widely distributed species of concern at the broad-scale, including many bird species, are evaluated in the effects analysis in Chapter 4 of the Supplemental Draft EIS.

**Comment:** The EIS should address the presence of non-native bird species and their effects on resident bird populations.

**Narrative:** *One respondent is concerned about the introduction of certain game birds (such as partridges, quail, and pheasant) and their habitat. He believes the decline of certain resident species, such as sage grouse, can be correlated to the introduction of these game species. This respondent feels that the Draft EISs give a cursory discussion on this subject and he wishes to see a further analysis of this association in the EIS.*

**Response:** Management of game bird populations is beyond the authority of the decision makers for this EIS. It is the responsibility of the states' fish and wildlife departments. Many exotic game birds were introduced in the late 1800s and early 1900s. While most releases of exotic game birds have ended because of the associated costs, the effects they have had on native species is not well documented.



**Comment:** The EIS should clarify information about bird associations with riparian and wetland habitats.

**Narrative:** *Some respondents feel that red-wing blackbirds are associated with riparian and wetland habitat, more so than flycatchers. They note that the Draft EISs state that western meadowlark and Brewer's blackbird showed consistent long-term decline, but elsewhere they state, "population increases of birds that use riparian areas, such as MacGillivray's warbler, western meadowlark, and Brewer's blackbird have increased, indicating some recovery in riparian systems." They ask what the last sentence means, since they believe that western meadowlarks are very rarely associated with riparian areas in the project area and can't tell whether Brewer's blackbirds are increasing or declining.*

**Response:** The statement on page 2-80 of the UCRB Draft EIS should have indicated that the two species of flycatchers are more likely to be affected by Forest Service or BLM management activities because of where they occur rather than degree of riparian association. The error regarding western meadowlarks has been deleted. Based on breeding bird surveys, Brewer's blackbirds have experienced a long-term decline.

The statement on page 2-84 of the UCRB Draft EIS is based on a citation from Callopy and Smith (1995). Several of the species are listed incorrectly, and the statement adds more certainty to recovery of riparian areas than did Callopy and Smith who state the increase is recent and that they "may" indicate an improvement in shrubland riparian habitat. The terrestrial species section of Chapter 2 has been updated and rewritten for the Supplemental Draft EIS to fix the errors and update it based on new science information.

## Domestic/Bighorn Sheep Habitat Conflicts

**Comment:** The EIS should clarify management prescriptions for bighorn and domestic sheep interactions.

**Narrative:** *Some individuals note potential habitat conflicts between domestic sheep and wild bighorns, and they are concerned about which species will win the right-of-way in management decisions. They believe the Draft EISs do not go far enough in describing management criteria for these interactions. Some assert that livestock should be removed from areas where bighorns are present. They believe that by lowering the exposure and risk of*

*transferable diseases from domestic species, wild populations will benefit genetically and also in habitat conditions. Some feel that site-specific analysis should be implemented to better address potential consequences of these situations.*

**Response:** Wildlife and livestock conflicts and issues are more appropriately addressed at the mid- or fine-scale because the solutions are best served through collaborative efforts among local entities, including ranchers, state fish and game agencies, the general public, and local Forest Service and BLM managers. Because of its fine-scale nature, standard HA-S21 was not brought forward from the Draft EIS.

Collaboration is strongly emphasized throughout the EIS. In general, the domestic sheep and bighorn sheep issue is addressed by existing agency (Forest Service and BLM) policy that pursues minimizing the interaction of domestic and bighorn sheep on federal lands. Although the Supplemental Draft EIS addresses this issue in an objective under base level direction.

## Big Game

**Comment:** The selected alternative should emphasize the protection of big game species, such as deer, elk, and moose.

**Narrative:** *Many individuals in the project area feel that big game population health and security are priorities. For these respondents, big game animals not only represent wildness and spiritual values, but these species are also vital to the social and economic considerations of people responding. Individuals have not been able to determine management directions for large ungulate species. They feel evaluations of habitat needs and management effects on species viability have not been performed.*

*Some people feel the agencies need to address the issue of large numbers of deer and elk populations moving to private land. Others feel that road policies should be modified because they dictate habitat conditions for these species.*

**Response:** Specific direction is provided in some alternatives in the Draft EISs and Supplemental Draft EIS for certain groups of species that have been identified as being of concern at the broad-scale. Emphasis is given to habitats rather than populations of these species, as management of habitat is within the responsibility of the Forest Service and BLM.

Addressing the effects of deer and elk on private lands and the management of animal population numbers is the responsibility of the states' fish and



wildlife departments, and not within the jurisdiction of the BLM or the Forest Service.

The Terrestrial and Aquatic Species section of Chapter 3 of the Supplemental Draft IES contains management intent and direction on three specific areas for terrestrial and aquatic species habitats: (1) providing for conservation of basin-wide species of concern; (2) providing quality habitat to support harvestability, which is important to both tribes and states; and (3) providing for terrestrial and aquatic species habitats which are not addressed by source habitats or with other direction (such as species with special habitat needs).

**Comment:** The EIS should correct the statement in the Eastside Draft EIS that refers to pronghorn antelope as a "lowland species," because the vast majority of pronghorns inhabit the high plains of the project area, that is, 3,000 feet elevation or higher.

**Response:** The statement "pronghorns as a species generally inhabit upland shrublands and upland herblands on flat or gently sloping terrain" would be more correct. However, the description in the Eastside Draft EIS is not technically incorrect in that in the interior Columbia River Basin, 3,000 feet is considered low elevation.

## Grizzly Bears and Wolves

**Comment:** The selected alternative should provide adequate management direction for grizzly bears, wolves, and other predators.

**Narrative:** *Many are concerned with the management standards for predators, because they feel these species are important links in properly functioning ecosystem processes. They believe that lynx, martens, wolverines, and mountain lions all need proper management provisions to maintain viable populations and restore predator-prey balances.*

*Some say that reintroduction of grizzly bears and wolves is vital for the long-term viability for species and proper management strategies are needed for the assurance of species health. They want more protection than the agencies are offering and request more restrictions of management to ensure species recovery, because they believe that parts of the project area are natural grizzly bear and wolf ecosystems. They claim that the preferred alternative will not be sufficient for grizzly bear viability and will not meet the expected desired range of future conditions. Many feel that a management plan where*

*grizzly bears might experience extirpation is contrary to the provisions of the Endangered Species Act. Advocates of grizzly preservation assert that management activities such as road building and logging are detrimental to proper habitat and will lead to reduced numbers if habitat and management decisions are not improved.*

*Others state there is too much emphasis on grizzly management and believe that special management is not important if the project area will not be able to support a breeding population anyway.*

**Response:** The reintroduction of species under the Endangered Species Act is under the authority and supervision of the U.S. Fish and Wildlife Service and National Marine Fisheries Service. Direction in the Draft EISs and Supplemental Draft EIS is intended to be consistent with recovery efforts as required by law.

The Draft EISs and Supplemental Draft EIS include direction to contribute to recovery of federally threatened, endangered, or proposed species, including grizzly bears and wolves, by restoring and maintaining habitat quality, quantity, and effectiveness. Alternatives S2 and S3 in the Supplemental Draft EIS include objectives to balance long-term restoration needs of listed and proposed species against short-term risks to them. Subbasins identified as containing the highest quality habitat for certain wide-ranging carnivores, including grizzlies, are covered by direction that emphasizes restoration of habitat.

**Comment:** Standard HA-S17 directs management activities to be consistent with access management recommendations in the Cabinet/Yaak and Selkirk Mountains Grizzly Bear Recovery Zone. Most or all of this area is outside the Eastside planning area. The EIS should indicate how this standard relates to the Eastside EIS planning area.

**Response:** HA-S17 was not carried forward to the Supplemental Draft EIS; however, the intent of HA-S17 is carried forward by base-level direction that calls for management activities to be consistent with recovery plans and conservation strategies for wide-ranging carnivores and to the Interagency Grizzly Bear Committee task report.

## Other Mammals and Predators

**Comment:** The EIS should revisit assumptions, standards, and objectives for management of bat roosts and hibernacula.



**Narrative:** *One respondent is concerned about the need to protect bat roosts found in or on trees, caves, cliffs, old mines and the ground, not just those areas identified in HA-S12. The respondent perceives a disconnection between the assumption presented in the environmental consequences chapter on bat roosts and hibernacula and the management standards proposed in the Draft EISs. In particular, this individual thinks that protecting these areas while actively restoring the ecosystem as identified in Alternative 4 is contradictory and will result in adverse effects on bat populations because of the difficulty in accurately identifying these sites. Another individual questions the prudence of protecting habitat for a species perceived as a carrier of rabies as part of the ecosystem.*

**Response:** Several alternatives in the Draft EISs and Supplemental Draft EIS provide direction to maintain and restore special habitat features, including bat roosts and hibernacula, and to conduct management activities in a way that protects these features. The Supplemental Draft EIS discloses effects on bat species of concern in Chapter 4.

**Comment:** The EIS should incorporate accurate science in its management standards for small mammal species.

**Narrative:** *Some state that without full and complete knowledge of the distribution, occurrence, and population status of species, adequate protection of mammal species will not occur. For example, some believe there is a lack of data on pygmy rabbit habitat type, distribution, and numbers in the area. They claim that pygmy rabbits require dense sagebrush cover to live, and they believe that Alternatives 4 and 6 would control or eradicate sagebrush. This procedure is interpreted to be the opposite of what the science says. They feel that without proper evaluation of these and other species types, management decisions cannot be appropriate and will have no scientific merit. Some also dispute the science behind the Draft EISs' statement that some ground squirrel species have benefitted from loss of ground cover. These respondents claim that loss of shrub cover, such as big sagebrush, negatively affects ground squirrel populations and that declines in populations have occurred within the region.*

**Response:** Pygmy rabbits and several ground squirrels are identified as species of concern because of loss of native grassland and shrubland communities to agricultural conversion or noxious weed infestation. It is recognized that sagebrush and grassland communities are key to the long-term viability of many species. There is no intent in any alternative to eradicate sagebrush.

The major findings in the *Assessment of Ecosystem Components* in combination with public scoping and

public comment on the Draft EIS, were used to develop management direction contained within Chapter 3 of this EIS. To ensure consistent application of scientific information, the EIS Team frequently interacted with members of the Science Integration Team and Science Advisory Group in development of the EIS. Project scientists periodically review the EIS to ensure that the EIS Team correctly interpreted and applied scientific concepts, information, and assumptions. Inconsistencies were either modified or explained.

## Amphibians and Reptiles

**Comment:** The EIS should provide accurate and scientific data and information, and address range management effects on amphibian and reptile species.

**Narrative:** *For both amphibian and reptile management standards, some people cite a lack of clarity in the Draft EISs and request that they be rewritten to include accurate scientific data and more detailed standards. Some question where these species actually exist in the interior Columbia River Basin, since they perceive the maps and data to be incomplete and vague. For example, they note the title of Eastside Map 2-8, which implies that the data are for the Columbia Gorge only, yet the entire Eastside planning area is shown. The respondent cannot determine whether amphibians are missing from most of the planning area because the input data set covered only a portion of the planning area, or whether the amphibians truly are only present near the Columbia Gorge. They ask that the sources of data and the geographic areas which the data represent be included, and that the map be clarified in the EIS.*

*Some people maintain that frog habitat will continue to decline unless the agencies correctly manage for wildlife needs instead of livestock interests. They believe that grazing practices alter pond hydrology and remove essential vegetation which amphibians need.*

*Some people claim that the discussion of management effects on reptile species in the Draft EISs is almost non-existent. They believe that serious habitat destruction has occurred from grazing practices and agricultural conversion. They also assert that loss of shrub cover has had a major impact on lizard habitat, and they request that the agencies deal with these issues.*

**Response:** The discussion of effects on amphibians and reptiles in the Supplemental Draft EIS has been refined to focus on broad-scale effects. Range maps of species of broad-scale focus are available in *Source Habitats for Terrestrial Vertebrates of Focus in the interior*



*Columbia Basin* (Wisdom et al. 1998). Eastside Map 2-8 has not been carried forward to the Supplemental Draft EIS.

## Invertebrates

**Comment:** The EIS should delete statements that describe relationships without any indication of significance or importance or that exaggerate vegetation changes on invertebrates.

**Narrative:** *One respondent notes that Eastside Draft EIS (page 2-74) states that habitat effectiveness for some soil invertebrates is reduced from increased compaction and soil displacement, but they state that no indication is provided regarding the relationship's importance to ecosystem function. They also feel that describing effects of vegetation changes on invertebrates is broadly overstated and speculative, and that the EIS should correct deficiencies of the assessment and eliminate speculation.*

**Response:** Key ecological functions of invertebrates are discussed on page 2-72 of the Eastside Draft EIS and in Chapter 2 of the Supplemental Draft EIS. Because of the broad-scale nature of the EIS, information is somewhat limited for invertebrates, but recent research indicates that their role is necessary and substantial in several areas including soil productivity and as food sources for many vertebrate species. The discussion of invertebrates in the Supplemental Draft EIS has been reviewed to assure it reflects the level of current scientific knowledge.

## Fish

**Comment:** Historical information on salmonid occurrence should be verified in the EIS.

**Narrative:** *Many criticize what they see as a lack of verified information in the Draft EISs regarding historical ranges and baseline values for specific fish species. They feel that clarity is needed in the discussions of species richness and biotic integrity, which should be expanded to reflect the Draft EIS focus on basin-wide ecosystem conditions and to include comparisons to historical baseline values. Some people fear that native fish are vulnerable because of restricted distribution. Some assert that fragmented habitat and isolation have resulted in substantially different composition and status of native fish from historical levels. Some blame past management decisions for the decline in the bull trout population.*

**Response:** Estimates of historical ranges for the key salmonids within the project area are defined in Appendix 4D of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997). Estimates of historical ranges were based on known historical distributions in published literature, historical accounts, and speculative distributions as summarized in the Idaho, Montana, Oregon, and Washington River Information System databases, expanded to include any natural occurrences in the status survey that were not included in the historical distribution (Lee et al. 1997).

**Comment:** The selected alternative should provide better standards that provide long-term protection for native anadromous and inland fish populations and adequate plans for restoration of habitat for special status fish species.

**Narrative:** *Some respondents want better habitat protection for various fish species including bull trout, steelhead trout, chinook and other salmon, redband trout, and westslope cutthroat. They feel that none of the alternatives address habitat improvements in a manner conducive to change. These people want the alternatives to focus on the degradation caused by management activities. Some suggest establishing reserves and refuges throughout the basin to preserve habitat and spawning areas.*

*Some people suggest that management decisions need to protect remaining high-quality watersheds and restore those that are below standards for fish habitat. Some contend that the agencies are not preventing basic practices, such as logging, which they perceive to be instrumental in the decline of original habitat conditions. They feel that certain baseline standards should be implemented to provide conditions where fish can survive and flourish.*

*Some fear that aggressive management will have a negative impact on fisheries. Some criticize the preferred alternative because they believe it allows an increase in total miles of roads and fails to provide adequate plans or funds to restore endangered salmon or declining trout and steelhead populations.*

**Response:** Through the inclusion of the Biological Opinions in Alternatives S1, and identification of the aquatic A1 and A2 subwatersheds and an integrated restoration strategy in Alternatives S2 and S3, enhanced protection and restoration of aquatic health is intended. Specific standards and objectives for enhanced ecosystem health in these areas are included in the Supplemental Draft EIS.



**Comment:** Errors about redband trout should be corrected in the EIS.

**Narrative:** *Some respondents dispute the Draft EIS statement that "Residents and resident-interior redband trout...are classified as sensitive species by the Forest Service and BLM" (UCRB Draft EIS page 2-142). They believe this statement is correct for Region 1 and 6 of the Forest Service, but not for the Intermountain Region (Region 4). They note that Appendix E, Table E-2, does not list redband trout as a sensitive species within Region 4.*

**Response:** The statement in Chapter 2 of this EIS has been corrected to identify that Regions 1 and 6 of the Forest Service classify redband trout as a sensitive species.

**Comment:** The EIS should provide an analysis and discussion of how activities in Alternative 5 would affect the persistence and viability of bull trout in the core distribution areas, and should identify these areas. The Draft EIS conclusion that Alternative 5 would not conserve strong populations of bull trout is not defensible and should be corrected.

**Narrative:** *Some respondents take note of a sentence, "persistence and viability of bull trout throughout the core distribution area is expected in Alternatives 2, 3, 4, 6, and 7" (Draft EISs page-4-144). They feel that this implies that bull trout populations would suffer under Alternative 5, which they feel is not substantiated.*

**Response:** The statement actually reads, "Habitat for viable populations of bull trout throughout the core distribution would be expected under Alternatives 2, 3, 4, 6, and 7." The statement referred to in Chapter 4 of the Draft EIS is based upon the finding of the Science Integration Team in the *Evaluation of EIS Alternatives*, (Volume 1, page 477). A new effects analysis for Alternative 5 was not undertaken for the Supplemental Draft EIS.

Bull trout is listed under the Endangered Species Act and will be managed to comply with the Act in cooperation with the U.S. Fish and Wildlife Service.

**Comment:** The statement that "Alternatives 1, 2, and 5 would result in the continued decline in the overall status of steelhead and stream-type chinook salmon stocks because of a minimal emphasis on restoration and continued land disturbance in portions of the current range over the long-term" is not supported by discussion in the Draft EIS. The EIS should provide an evaluation of how continued

land disturbance and management under each alternative's standards and objectives would affect fish, or it should state that the evaluations are inconclusive.

**Response:** Chapter 4 of the Supplemental Draft EIS discusses the environmental consequences of the alternatives on aquatic habitat and key salmonid status and distribution. Alternative evaluation accounted for the effect of soil disturbance and management standards and objectives on aquatic habitat capacity and key salmonid status and distribution.

**Comment:** Add redband and cutthroat trout from standard EM-S8 in Alternative 6 to Alternative 4.

**Response:** Standard EM-S8 which required Ecosystem Analysis at the Watershed Scale prior to certain activities in specific areas has been replaced by a modified standard in the Step Down section in Chapter 3 of the Supplemental Draft EIS.

**Comment:** The EIS should clarify the ramifications of classifying watersheds into Categories 1, 2, and 3.

**Narrative:** *Some respondents object to the classification of watersheds into Categories 1, 2, and 3. Some feel that the Draft EISs fail to disclose the impacts of this classification system on resource outputs, which they feel tilts the planning process toward protection of fisheries at the expense of human needs.*

**Response:** In the Supplemental Draft EIS, management direction is not tied to the subbasin categories. Subbasin category information is used to assist in identifying broad-scale aquatic and integrated restoration priorities, which are identified in Appendix 15 to this EIS.

**Comment:** The EIS should disclose the number of watersheds with anadromous fish species and the status of these populations under Alternative 7.

**Narrative:** *Some individuals request that the EIS include a reasonable and adequate analysis of the provisions of Alternative 7 regarding road construction and the spatial distribution of anadromous fish.*

**Response:** Alternatives S2 and S3 identify aquatic A1 and A2 subwatersheds that contain strong and important anadromous fish populations. No additional work was done on Alternative 7 for the Supplemental Draft EIS.



**Comment:** The EIS should include basin-wide standards to manage fish habitat and water quality objectives at a regional level.

**Narrative:** *Some are concerned that the agencies' proposed standards are variable for different watersheds. They feel there is no available scientific data demonstrating that biological requirements of fish can vary in different rivers. They claim that the Forest Service and BLM are adjusting fish habitat standards so the standards do not interfere with extractive industry aspirations.*

**Response:** The intent of many standards for Alternatives S1, S2, and S3 is to protect, enhance, and maintain native fish populations, habitat and water quality. Many of these standards are located in the base level direction which applies across the project area. Others are found in the restoration or aquatic A1 and A2 subwatershed direction which applies to specific areas. The specific effects of the aquatic management direction is disclosed in Chapter 4 of this EIS.

**Comment:** The agencies should clearly evaluate the Draft EISs preferred alternative's effects on anadromous fish populations.

**Narrative:** *Some individuals feel there are many contradictions and deficiencies in the standards of the Draft EISs with regard to anadromous fish populations. They also feel that the Draft EISs based the evaluation of Alternative 4's effects on invalid assumptions that "warp the analysis."*

**Response:** The evaluation of alternatives for the Draft EISs preferred alternative was based on the Science Integration Team's *Evaluation of EIS Alternatives* (Quigley, Lee, and Arbelbide 1997). The Science Integration Team also completed an evaluation of the three alternatives in the Supplemental Draft EIS, which was the basis for the effects analysis in Chapter 4 and is the basis for the selection of the preferred alternative for this EIS.

**Comment:** The EIS should describe federal goals with regard to fish, contrast them with state goals, and explain why the two are inconsistent.

**Narrative:** *A respondent notes that the Draft EISs state that "the goals of states' natural resource agencies are not specifically aimed to protect aquatic ecosystems and biodiversity, but to meet societal needs while disrupting ecological processes and conditions as little as possible" (Draft EISs, page 4-153). They want to know what these state goals are and how they conflict with federal goals.*

**Response:** State management statutes, regulations, and goals are not necessarily the same as Forest

Service or BLM goals. For example, Forest Service and BLM land management plans must meet state forest practices acts rules and regulations. Generally, federal land management plans exceed state requirements because of public issues and other legal requirements, such as species viability and the Endangered Species Act. The Federal Land Policy and Management Act and National Forest Management Act require federal land management agency plans to identify consistencies and inconsistencies with other federal, state, tribal, and local land use plans. Chapter 1 of this EIS contains the results of this consistency review. Additional consistency reviews will occur during the governors' reviews of the Final EIS.

**Comment:** The statement in the Draft EISs (E-4-154) that Alternative 5, outside of aquatic emphasis areas, would result in broad-scale fragmentation of aquatic and riparian environments is not scientifically supported in the Draft EISs. Justification for the statement should be provided or such statements should be removed from the EIS.

**Response:** Alternatives S2 and S3 in the Supplemental Draft EIS were developed in response to public comment on the Draft EISs and new scientific information. No new analysis has been done on Draft EIS Alternative 5.

**Comment:** Standard AQ-S50, to "manage livestock to prevent unauthorized disturbance to redds," should be a guideline.

**Narrative:** *Referring to standard AQ-S50, which includes direction to "manage livestock to prevent unauthorized disturbance to redds," some people think the EIS should allow discretion for incidental disturbances and leave the decisions and enforcement tactics to local land and fisheries managers.*

**Response:** This standard has not been brought forward to the Supplemental Draft EIS.

**Comment:** Standard AQ-S51, which states that "livestock access and human activities should be managed to minimize adverse impacts on redds and sensitive species," should be deleted.

**Narrative:** *Referring to standard AQ-S51, some people think the EIS should make a decision either to manage entire ecosystems or to manage single species. They feel that this standard is contrary to the basic idea of ecosystem management.*



## Appendix 4: Response to Comments

**Response:** This standard has not been brought forward to the Supplemental Draft EIS.

**Comment:** The EIS should adequately address the effects of Forest Service and BLM management activities on fisheries resources.

**Narrative:** *A number of respondents are concerned about detrimental effects on the fishery resource from other management activities. Some other individuals feel that management activities have enhanced habitat for fish populations and that the Draft EISs do not discuss the benefits of management activities. Some felt that the effects of some but not all management activities were adequately displayed; they feel that the effects of grazing, mining, and logging should be better exhibited in the EIS. Some believe that fishery conditions will not improve unless measures are employed to limit or stop grazing practices. Some are concerned specifically about logging in the vicinity of fisheries. Some say that spawning habitat is ruined from sediment resulting from logging practices. Others, citing personal experience on the Kootenai National Forest with what they consider some of the best fisheries in the country, feel there is no connection between logging and degraded habitats. Some believe proper logging practices can enhance fish habitat by supplying nutrients and structure into fisheries.*

*Others claim that toxic chemicals are another reason for habitat loss and should be considered in the EIS. Effects from forest fires are also of concern to many who feel that proper standards should be used to minimize negative effects on water quality and fish habitat.*

**Response:** Chapter 4 of the Supplemental Draft EIS discusses the environmental consequences of the alternatives on aquatic habitat and key salmonid status and distribution. Alternative evaluation accounted for the effects of soil disturbance due to management activities and management standards and objectives on aquatic habitat capacity and key salmonid status and distribution.

**Comment:** The EIS should adequately address the effects of non-Forest Service and BLM management activities on fisheries resources.

**Narrative:** *A number of respondents are concerned about the effects on the fishery resource from other management activities outside of Forest Service or BLM jurisdiction. They feel that the long-term sustainability of the resource cannot be assured without addressing such management activities in the EIS. Concerns over the effects of hatcheries, dams, and hydroelectric power are among those felt to be inadequately discussed in the Draft EISs. Some feel the Draft EISs ignore detrimental impacts of oceanic events, such as heavy fishing and current changes, on river fish populations. Some individuals claim the EIS should address harvesting and the introduction of exotic species, sport fishing, and fisheries management, which they believe can cause significant declines in fish populations.*

**Response:** Management of hydropower, fish harvest, and hatcheries is not in the purview of the Forest Service and BLM. However, recognition and consideration are given in this EIS in Chapters 2 and 4 as to



how these activities and conditions affect fish resources on Forest Service- or BLM-administered lands. Consideration of these activities and conditions are included in the cumulative effects of the alternatives. Even though conditions or activities outside agency jurisdiction may contribute to ecosystem health problems, the agencies retain a responsibility to properly manage the lands they administer and avoid contributing further to the problems.

**Comment:** The EIS should adequately address effects of road management on fish populations. Emphasis should be placed on protecting unroaded areas.

**Narrative:** *Some individuals feel that the presence of roads will encourage more mining and logging, which will threaten fish populations. Others state that the Aquatic Assessment and the Draft EISs acknowledge the relationship between road densities and fish populations, but that the Draft EISs do not include direction to protect roadless areas and areas with low road densities. One individual states the opposite view, that what is being reported does not conform with what that person has seen and experienced through many years of fishing on the Kootenai National Forest.*

*One respondent claims that road density is not a valid measure for evaluating impacts on fish because of human activities as discussed in Chapter 4 of the Draft EISs, and that the EIS must clearly state these facts.*

**Response:** One purpose of the EIS is to provide broad-based direction relating to road management, among other things. The intent of the road management direction in Alternatives S2 and S3 is to reduce adverse effects of roads on aquatic and terrestrial species. Decisions on how to reduce effects will be done at the local level.

The effects of the road management direction is included in the aquatic habitat capacity analysis. The results of this analysis are discussed in Chapter 4.

**Comment:** The Draft EISs should have had a section that specifically mentioned the Wild and Scenic Rivers Act and requirements of the Act concerning protection of outstandingly remarkable fisheries value.

**Response:** The Draft and Supplemental Draft EISs recognize the significance of laws, directives, and regulations with which the Forest Service and BLM must be in compliance when preparing an environmental analysis document. Some laws are mentioned to bring clarity to the issue at hand (such as the Endangered Species Act). Other major laws, including the Wild and Scenic Rivers Act, are noted in Appendix 1. This EIS will not conflict with the Wild and Scenic Rivers Act, nor with protection of outstandingly remarkable fish values.



# Social-Economic-Tribal Components of the Ecosystem

## Economics

### Community Resiliency

**Comment:** The economic analysis in the EIS should recognize that resource-dependent communities are not as resilient as the EISs suggest and cannot sustain economic changes resulting from implementation.

**Narrative:** *Many people voice opposition to the project based on a perception that the Draft EISs expect rural communities to switch their economic base from natural resources to tourism. They feel that changing their economies to tourism and recreation-based industries will consequently destroy their towns. Some suggest the Draft EISs make unproven generalizations by assuming that resource-dependent communities can rely on tourism for an economic base to attract tourists, especially communities without destination resort amenities, such as in Glacier or Yellowstone national parks. Others question how proposed road closures will affect the recreational opportunities on which the EIS expects communities to rely for income. Some feel that boom-and-bust cycles in smaller communities should be discussed in the EIS.*

**Response:** The Chapter 2 descriptions of the current situation state that isolated natural-resource-dependent communities are vulnerable to decreases in federal timber and other resource supplies. The chapter also discloses that some of the counties and communities with large recreation and tourism components are fast growing with diverse economies. The Draft EISs do not suggest rural communities switch their economic base from natural resources to tourism and recreation-based industries.

Boom-and-bust cycles in smaller communities are discussed in the Draft EISs. The discussion of the Forest Service even-flow timber policy in Chapter 2 specifically addresses this concern. Seasonal employment issues connected with special forest products gathering and recreation use are also recognized.

An objective in several alternatives of the Draft EISs specifically addresses the challenges faced by communities with few economic options. In the report, *Economic and Social Conditions of Communities* (ICBEMP 1998), isolation is identified as a key concern that limits the ability of communities to deal with changing economic conditions and to diversify their economic base. The issues of the isolated communities are addressed in the Socio-economic section in the Supplemental Draft EIS.

### Community Dependency

**Comment:** The selected alternative should consider economic impacts on resource-dependent communities.

**Narrative:** *Some respondents believe the government should provide assistance to communities trying to diversify and stabilize their economies. They believe that without this help few towns can successfully make the transition to more diversified or amenity-based economies. They assert that public lands were set aside with the intent of relying on them for multiple use, and that timber dollars are a necessary ingredient in maintaining the vitality of many communities. They feel that the EIS should include a strategy for prioritizing activities when funding is limited, with resource-dependent communities high on the list of priority areas for continued management.*

**Response:** After release of the Draft EISs, a social and economic characterization of 543 communities in the project area was conducted (ICBEMP 1998), that identified communities within subbasins and their geographic isolation. Specialized industries in communities within the project area were profiled, and 16 categories were used to describe and compare communities with different attributes and industry specialization. The report then assessed possible impacts of implementing each of the Draft EIS alternatives on the categories of economically specialized communities and provided a discussion of cumulative impacts. It was not practicable or possible to assess specific impacts of each alternative on each individual community or location in the project area, because the Draft EIS alternatives themselves are not



location-specific and because the data are not available to make such specific predictions.

The Supplemental Draft EIS addresses an integral part of an overall socio-economic strategy for the interior Columbia River Basin which links land and resource management actions and strategies with the social and economic needs. The strategy contains three components: products and services from forest and range lands; organizational support for economic and social needs for communities and cultures; and support of economic adjustment initiatives.

The Social-Economic-Tribal component of the Supplemental Draft EIS provides objectives, standards, and guidelines intended to support the economic and social needs of people, cultures, and communities, and to provide sustainable levels of products and services within the capabilities of the ecosystem. The restoration strategy identifies high restoration priority subbasins partly on the basis of economic and social needs and values.

**Comment:** The Purpose and Need should not maintain economic subsidies for resource-dependent communities and industries that are not resilient to change.

**Narrative:** Many respondents speak out against continued community dependence on resources and what they believe to be government subsidies in support of these communities. They suggest communities can supply timber without being timber-dependent, and logging will continue to contribute to the economy, but it must be done responsibly. Others feel that public lands are for public use, not commercial use, and commercial interests should not benefit from any taxpayer subsidies. Some believe the Draft EISs are too concerned with extractive industries such as mining, timber, and grazing.

**Response:** In developing and implementing decisions, the Forest Service and BLM are guided by basic principles and priorities. Both the Forest Service and BLM are multiple-use agencies that promote the sustainability of ecosystems by ensuring their health, diversity, and productivity. Overall priorities for management will include:

- ♦ *Protecting Ecosystems.* The agencies will work to ensure the health and diversity of ecosystems while meeting people's needs. Special care for fragile or rare ecosystem components will be provided on lands administered by the Forest Service or BLM.

- ♦ *Restoring Deteriorated Ecosystems.* The Forest Service and BLM will improve deteriorated ecosystems on lands they administer, based on scientific understanding and emerging technologies.
- ♦ *Providing Multiple Benefits for People Within the Capabilities of Ecosystems.* Within the limitations of ecosystem integrity, health, and diversity, forests and rangelands also must meet people's needs for uses, values, products, and services.

**Comment:** The selected alternative should allow continued resource extraction in a manner that meets local economic and ecological needs and provides economic stability to rural communities.

**Narrative:** Some respondents argue that resource extraction is a vital use for the land. They believe that without timber harvest, supply and demand levels will become unbalanced, both in the United States and worldwide. Some assert that all alternatives as described in the Draft EISs fundamentally disregard the needs of people in the basin. They claim that the alternatives consider mining, timber, and grazing only as by-products of maintaining ecosystem health, with future production levels uncertain.

Some respondents note that although there is no specific legal mandate to provide economic stability to rural communities, legislative history provides numerous references to suggest such an obligation. They point to legislative direction that permits and encourages consideration of community economic stability when planning or implementing plans, such as: the Organic Act of 1897, White Pine Blister Rust Protection Act of 1940, Sustained Yield Forest Management Act of 1944, National Forest Management Act of 1976, Small Business Administration Act, and National Forest-Dependent Rural Communities Economic Diversification Act in the 1990 Farm Bill.

**Response:** The Supplemental Draft EIS includes a socio-economic strategy for the interior Columbia River Basin. This strategy links land and resource management actions and strategies with social and economic needs and strategies. The strategy contains three components: products and services from forests and rangelands; organizational support for economic and social needs for communities and cultures; and support economic adjustment initiatives. In the selection of an alternative, decision makers will consider social and economic effects. National and international supply and demand considerations for wood and range products and the balance of trade are outside the scope of the Draft EISs.



**Comment:** Correct or delete the graph on page 20 of the Socio-Economic Report.

**Narrative:** *Some feel that the graph on page 20 [of Economic and Social Conditions of Communities, February 1998] is wrong. They note that the specialization ratio is defined as percent jobs in the community divided by percent jobs in the region, but since all data are taken from communities with data, the specialization ratio of isolated plus non-isolated communities divided by the total must equal one.*

**Response:** The information presented in the report accurately portrays the industry specialization for the 423 communities in the project area. As noted on page 1 of the *Economic and Social Conditions of Communities* (ICBEMP 1998) report, the information collected for the 423 communities was used to characterize industry specialization for those communities.

**Comment:** The Socio-Economic Report is inadequate and does not meet the intent of Congress.

**Narrative:** *Many believe the Economic and Social Conditions of Communities (ICBEMP 1998) report, completed after Congress mandated further study, is inadequate, incomplete, does not meet its intended purpose, and fails to comply with the Department of the Interior and Related Agencies Appropriations Act of 1998. They state this report does not consider different methods of assessing recreation employment in the basin, or have tables displaying incomes associated with various jobs in the region or have a subbasin review. They feel that the report also does not address the impacts of each alternative at the community level. Many feel that it is no better than the socio-economic analysis in the Draft EISs and therefore they believe there should be no record of decision. Some people call for the development of a new supplemental EIS to address the economic impacts of the project at a community level. Some suggest a new report that leaves rural communities intact.*

**Response:** Part 323(b) of the 1998 Interior Appropriations Bill directed the project "to the extent practicable, [to] analyze the economic and social conditions, and culture and customs, of the communities at the subbasin level... and the impacts the alternatives in the Draft EISs will have on those communities." The report responds to this direction by including a social and economic characterization of 543 communities in the project area, with subbasins and geographically isolated communities identified. Specialized industries in project area towns are profiled, and 16 categories are used to describe and compare towns with different attributes and industry specializations. The

report then assesses possible impacts of implementing each of the Draft EIS alternatives on the categories of economically specialized communities and provides a discussion of cumulative impacts. It is not practicable or possible to assess specific impacts of each alternative on each individual community or location in the project area, because the Draft EIS alternatives themselves are not location-specific and because the data are not available to make such specific predictions. The project thus complies with congressional direction by providing to the extent practicable an analysis of the economic and social conditions of the communities in the interior Columbia River Basin and the potential socio-economic impacts of each alternative on the types of communities in the project area.

## Economic Analysis

**Comment:** The economic analysis in the EIS should address incomplete or inadequate information.

**Narrative:** *Most people responding to the economic analysis section of the Draft EISs find different aspects inadequate or incomplete. General comments include a perception that the analysis is based on unscientific terms and that the project is an unproven management theory that could have negative impacts on many communities. Some believe that the Draft EISs contain an anti-resource ethic evident in this perceived lack of scientific study. Others want the EIS to address the effects of development, recreational or otherwise, on agricultural lands. Many feel the analysis does not distinguish between rural and urban areas and is too broad to apply to communities within the entire project area. One suggests that analysis at a smaller scale such as subbasins would allow study of potential direct and indirect effects on local economies.*

**Response:** The Draft EISs are based on the most current scientific processes and knowledge as described in the assessment documents. The Council on Environmental Quality (CEQ) regulations for implementing procedural provisions of the National Environmental Policy Act (NEPA; 40 CFR 1502.22) require federal agencies to identify relevant information that may be incomplete or unavailable for an evaluation of reasonably foreseeable significant adverse effects in an EIS. If the information is essential to a reasoned choice among alternatives, it must be included or addressed in the EIS. While additional information may add precision to estimates or better specify relationships, new information is unlikely to significantly change the understanding of the relationships that form the basis of the evaluation of effects. Although new information is welcome, no missing information was deemed essential to making a



reasoned choice among the alternatives being considered at this scale and at this time.

The direction in the Supplemental Draft EIS is applicable only to lands administered by the Forest Service and BLM; however, the Supplemental EIS considers the effects of activities on all lands in the project area at the broad scale. This cumulative effects analysis is described in Chapter 4 of the EIS.

Differences in the effects of the alternatives on urban and rural areas is identified in the Draft EISs. A supplementary report, *Economic and Social Conditions of Communities* (ICBEMP 1998), also more completely addresses the social and economic effects of the alternatives at the community level. The Supplemental Draft EIS includes a process for Subbasin Review, which includes a socio-economic component.

**Comment:** The EIS should include a county-level or community-level, not just regional, economic analysis. The unique characteristics of small communities should be recognized and not lumped into larger economic units.

**Narrative:** *Some respondents suggest that the EIS needs to include a county-level or community-level economic analysis to address the potential impacts of reduced resource use. They feel that the Draft EISs and Economic and Social Conditions of Communities report (ICBEMP 1998) are too broad and do not provide enough information to enable communities to predict potential impacts under each alternative. They suggest the EIS address the county-level fiscal impacts resulting from the seven alternatives, especially where they predict mill closures, reductions in timber production, loss of road access, and reductions in recreational use will occur. They further suggest the EIS Team should develop location-specific alternatives and a community-specific economic analysis of each alternative.*

*Many feel the EIS inaccurately lumps communities into one category, making it appear that small, rural communities have the same economic characteristics as larger cities. Others feel that by lumping communities the Draft EISs do not consider that money earned from economic activities is not equally spread among communities.*

**Response:** The supplementary report, *Economic and Social Conditions of Communities* (ICBEMP 1998), was published to more completely address the social and economic effects of the alternatives at the community level. However, the broad-scale focus of the Draft EIS alternatives does not permit a location-specific estimate of management direction and data necessary to predict specific impacts to communities or counties. The effects will be assessed to the extent

practicable in updates to national forest and BLM district land use plans, and other finer-scale planning documents.

The Supplemental Draft EIS identifies a social/economic strategy for the interior Columbia River Basin. This strategy links land and resource management actions and strategies with the social and economic needs and strategies. The strategy contains three components: products and services from forest and range lands; organizational support for economic and social needs for communities and cultures; and support economic adjustment initiatives. Alternatives S2 and S3 in the Supplemental Draft EIS provide location-specific direction.

**Comment:** Changes should be made to the summary document, *Considering All Things*: on page 12, add "regulation of downstream water flows and soil stability" to the ecosystem services box. On page 33, reword Issue 5 to define "disturbance processes" and add "and impacts" after "interactions."

**Response:** The wording of the issues in *Considering All Things* reflects the exact wording of the issues as described in Chapter 1 of the EIS. *Considering All Things* was published specifically to summarize the Draft EISs and will not be revised or reprinted.

**Comment:** The cost analysis displayed in the Eastside Draft EIS (Chapter 4, page 215) avoids discussion of economic losses due to catastrophic events under each alternative. The cost analysis should be revised to incorporate measures of potential losses because of catastrophic events.

**Response:** The cost analysis displays only the estimated costs and outputs of management activities under the three alternatives. Catastrophic events are not management activities and by their nature are unpredictable.

**Comment:** The justification for varying cost assumptions by alternative should be provided, or the cost assumptions should be treated equally among alternatives.

**Response:** The unit and activity cost assumptions are generally treated equally across the alternatives. The differences in alternative costs reflect different levels of activity and different management objectives identified in the alternatives. The revised cost analysis for the Supplemental Draft EIS provides



probable estimates of funding level allocations and associated outputs that would result from the management direction at various comparable and reasonable funding levels. Methods of developing the budget costs and outputs summary are provided in Chapter 4.

**Comment:** The objectives of the Draft EISs should be considered 'standards' because in the absence of the authority imposed by a standard the objectives will never be attained and will be overridden by the standards that implement the other resource objectives.

**Response:** The objectives are meant to be indicators for measuring progress toward attainment of goals and desired conditions. Standards are provided where needed. The objectives and standards are intended to complement and not "override" each other. The EIS Team has revised many of the objectives and standards to resolve potential conflicts among them and to clarify their intent.

## Employment

### Commodity-Based Employment

**Comment:** The analysis conclusion that four percent of the population in the project area is dependent on commodity extractive industries is inaccurate and/or misleading and should be re-evaluated.

**Narrative:** *The statement by one respondent, "I will lose my job and community," captures the sentiments of many toward the perceived effects of the proposed action. These people want the project to note that they depend on use of natural resources to make a living, whether in timber, mining, or ranching. They feel they are misrepresented by the Draft EISs, in particular, by assessments that assert four percent of regional employment is in extractive industries. In their estimation, this under-valuation of their towns and counties does not consider indirect employment and/or to address the relative importance of resource extraction in their communities.*

**Response:** The estimated percent of jobs in mining, ranching, and lumber and wood products is based on published state employment statistics. The basin-

wide percent of total jobs in these categories was four percent. The Draft EISs also recognize that this basin-wide estimate may mask different statistics at the county or community level. For this reason, key differences among counties are recognized in the Draft EISs in Chapter 2 and at the community level in the supplementary report, *Economic and Social Conditions of Communities* (ICBEMP 1998).

**Comment:** The criteria for deciding whether a community is resource-dependent is flawed; the EIS should reflect the true nature of these dependent towns.

**Narrative:** *Many claimed that Saint Maries, Idaho is a timber-dependent town, and other towns such as Libby and Troy, Montana, were also used as examples of towns that were incorrectly labeled. These respondents disagree with the Draft EISs not considering them as timber-dependent, and they cite examples of many who rely on the income from local mills. Others cite the mineral dependency of counties in Idaho, such as Caribou and Custer, which is not discussed in the Draft EISs.*

**Response:** In 1987, the Forest Service identified communities thought to be dependent on the national forests. The criteria used for that process included forest products employment that was at least 10 percent in a community and that local wood processing firms used at least 50 percent national forest timber. Recognizing the 1987 list did not account for population size, population growth, or geographic isolation, the Science Integration Team reassessed the 1987 list using these additional criteria. The rationale was that communities judged to be most at risk to changes in federal forest timber supply were those with small populations, located in counties with low population densities, and judged to be relatively isolated. The communities meeting these criteria were identified as timber dependent communities in the Draft EISs. The purpose of this analysis was to identify the communities most at risk from changing federal timber supplies. It does not imply other communities and businesses or individuals in these communities are not tied to federal timber supplies.

The supplementary report, *Economic and Social Conditions of Communities* (ICBEMP 1998), expanded this concept of timber dependency with the identification of communities that are specialized in timber products employment. This report identifies 137 communities as timber specialized. The report also identifies the communities that are small in population, isolated, and that have specialization in other industries tied to federal lands and resources. This report identified the community of Challis in Custer



County, Idaho as highly specialized in minerals. There was no detailed data for Bancroft in Caribou County, Idaho.

**Comment:** The selected alternative should set a balance between ecological health and extractive industries as the best means of preserving community integrity.

**Narrative:** *Some respondents say they value the lands administered by the Forest Service and BLM, but they point out that people "need to use (but not abuse) these resources" through diligent oversight to provide a sustained yield of commodities for future generations.*

*Some feel that considering employment in new sectors, such as restoration, is a step in the right direction. They note few restoration jobs created by the project will provide enough employment opportunities to replace those lost in the extractive industries. However, many feel those jobs that are generated should be incorporated into the economic analysis.*

*In contrast, others feel that a decrease in opportunities for extractive industries will not adversely affect the communities. They argue that the trend toward less extractive industry representation in local economies is inevitable, and they assert that economic strength can be maintained by sustainable extractive practices that consider ecological integrity.*

**Response:** The Forest Service and BLM are managed under applicable laws to provide for the multiple use of natural resources. This EIS intends to balance resource opportunities among timber, grazing, and mining industries; recreation and tourism; and maintenance and restoration of the ecosystems. Alternatives S2 and S3 provide a prioritization for restoration of these activities in certain areas.

One intent of alternatives is to provide a mix of goods and services that maximize net public benefit and promote community stability in an environmentally sound manner. Alternatives S2 and S3 address local participation of the workforce in management activities by giving higher priority to areas that are economically specialized in industries tied to goods and services.

**Comment:** The economic analysis in the EIS should focus on effects on commodity-based employment particularly timber-based jobs and salaries in individual communities.

**Narrative:** *Many responses from the residents of the interior Columbia River Basin indicate deep concerns about*

*lost jobs, less money for school and road funds, and declining community economic stability. Opinions are split on how and to what extent implementation of the Record of Decision will affect regional and small town economies. Some feel the project has little or no potential for negative effects on communities, citing evidence they believe supports the conclusion that employment sources are shifting from extractive to recreational activities. Others strongly assert that any plan that further limits their access to extractive commodities from federal lands will "sound the death knell" for many communities within the project area.*

*Respondents state that many local communities depend on timber sales for their economies. They assert the EIS, and in particular Alternative 4, should specify a specific volume of timber to be cut in the future. These people believe that the assurance of small tree and thinning harvest described in some alternatives will not be sufficient to sustain local economies, because small timber harvest may not contribute enough volume for mills, and therefore employee salaries, to survive. They ask how businesses can plan around unpredictability.*

**Response:** One of the purposes of the Supplemental Draft EIS is to support the economic and social needs of people and provide sustainable, predictable levels of products and services from Forest Service- and BLM-administered lands. The intent is to sustain a flow of economic benefits to local communities within the capability of the ecosystem in the project area. Alternatives S2 and S3 address local participation of the workforce in management activities by giving higher priority to areas that are economically specialized in industries tied to goods and services from Forest Service- and BLM-administered land. This EIS intentionally does not identify specific timber volume because of the broad-scale focus of this project. Volume of timber harvested will be addressed at the local level with local knowledge and information.

**Comment:** The statement on page 4-167 of the Eastside Draft EIS, "The economic value of ecological outcomes cannot be reliably estimated, although if successfully produced they provide valuable human benefits," conflicts with the last sentence, "...restoration activities also make an important human contribution through generating employment and economic activity."

**Response:** The statements are not conflicting but complimentary. Both recognize that ecological outcomes and restoration activities can provide both ecological and socio-economic values if successfully implemented.



## Timber

**Comment:** The economic analysis in the EIS should address the ability of Forest Service- and BLM-administered lands to produce a sustained-yield of timber.

**Narrative:** *A few respondents suggested that the EIS should contain an analysis on the ability of the two agencies to produce a sustained-yield of timber from Forest Service- and BLM-administered lands. Through this additional analysis it would provide the opportunity for a predictable level of timber products, which would allow the public to predict the effects on their community economies.*

*One individual notes that the Draft EISs claim to "broaden the meaning of sustainability to include all parts of the ecosystem and to account for the role of disturbance patterns and processes in shaping how ecosystem changes over time;" the respondent feels that such a disclaimer is a weak excuse for not completing a sustained-yield analysis. Another respondents wants a "sustained-yield minus 10 percent concept;" this respondent feels that such an approach will allow for a "conservative cushion" for timber outputs in the future.*

**Response:** The broad-scale focus of the Draft EIS alternatives does not permit a location-specific estimate of management direction and data necessary to calculate a sustained-yield timber estimate for each Forest Service and BLM administrative unit. This information will be assessed to the extent practicable in amendments and/or revisions of Forest Service and BLM land use plans.

**Comment:** The EIS should disclose the environmental and economic effects of decreasing timber harvests with the associated increase in imports on foreign and domestic markets.

**Narrative:** *Many respondents are concerned about imports of wood fiber. They believe we need to manage our own lands at a sustainable level to prevent the need for imports. Some feel that by importing lumber, the country is exporting jobs. They feel that consumption of goods is never discussed in the Draft EISs, however a reduction in harvest is discussed.*

*Others fear displacement of environmental effects if the source of regional wood fiber shifts overseas. They note that the United States has strict environmental regulations, but other countries such as Mexico and those of Central and South America do not. They feel that the United States has a scientific base to protect threatened, endangered, and sensitive species and by encouraging*

*imports from countries that do not, the nation is condoning extinction on other continents.*

**Response:** This broad-scale document considers the effects on lands administered by the Forest Service and BLM in the interior Columbia River Basin. The effects of changing federal land management policies on international trade and international environmental effects is not within the scope of this EIS.

**Comment:** It is not clear how timber jobs resulting from forest restoration activities were calculated in Evaluation of Alternatives (page 742). Jobs generated as a result of restoration should be incorporated into the economic analysis.

**Response:** A discussion on the calculation of restoration jobs is included in the Supplemental Draft EIS. The Supplemental Draft EIS incorporates restoration employment effects in the economic analysis. The Draft EISs in Chapter 4 identified restoration employment as a key effect of the alternatives and summarize the amount of restoration jobs by alternative.

**Comment:** The economic analysis should consider the source needed to supply timber to the country.

**Narrative:** *Some believe the EIS should reflect that timber jobs are increasing in the private industry, and that dependency on public land to supply timber for mills and loggers is decreasing. Others assert that some areas, such as southern Idaho, have little private land and their timber supply comes from Forest Service- and BLM-administered land.*

**Response:** Forest Service- and BLM-administered land provides a wide array of uses to the public which includes timber products. While the amount of timber harvest from federal lands has decreased over the last ten years, it still plays an important role in rural communities in the interior Columbia River Basin, and provides benefits for other resources (such as wildlife). The Supplemental Draft EIS provides a more in-depth discussion of the socio-economic needs and values of the communities in the interior Columbia River Basin.

## Livestock Grazing

**Comment:** The selected alternative should maintain grazing rates to protect local agricultural economies.

**Narrative:** *Some warn that the Record of Decision will drastically limit existing grazing rights, with a resulting*



*negative effect on local economies. One suggests government compensation; the respondent feels that if the project expects rural areas to withstand economic losses from livestock grazing, then it should provide income for agriculture to maintain their livelihood.*

**Response:** An important element of the need for developing an ecosystem-based management strategy is to support the economic and/or social needs of people, cultures, and communities, through sustainable and predictable levels of products and services from Forest Service- and BLM-administered lands. The selection of an alternative for implementation will be based, in part, upon which alternative best meets this need. However, the focus of this EIS is not to prescribe fine-scale decisions, such as grazing rates, but to protect and restore rangeland plant communities. Where grazing and livestock management activities can be conducted to achieve project goals and objectives, they are allowed. Specific rates and locations are local decisions to be made by managers based on local conditions and needs.

**Comment:** The value of the timber and forage importance index is not clear. The EIS should include a rationale for the timber and forage importance index and for differences in the indices when comparing outputs between the mid 1980s and the mid 1990s.

**Response:** The timber and forage importance index was not carried forward into the Supplemental Draft EIS. The discussion of dependency on grazing and timber in Chapter 2 has been clarified.

**Comment:** The Draft EISs do not adequately address effects on ranchers from management restrictions for threatened and endangered species.

**Narrative:** *Some respondents feel that the Draft EISs do not acknowledge that designation of threatened or endangered species, including steelhead trout and bull trout, already restrict ranching activities.*

**Response:** The Supplemental Draft EIS has more specific information on the impacts of management direction on the various industries within the interior Columbia River Basin than the Draft EISs do. However, impacts from Endangered Species Act consultation on individual projects are too fine scale to be addressed in this EIS. Management restrictions as a result of formal consultation involving a threatened or endangered species would vary depending on the issues, species, habitat, and livestock grazing operation. It would be difficult to depict the impacts at the

basin scale of the various management restrictions that could exist from a finer-scale consultation process.

Furthermore, impacts on the ranching industry would vary according to individual ranch conditions. Some ranchers have the flexibility to adjust their operations to meet management restrictions (such as altering seasons of use in riparian areas). Other ranchers do not have flexibility in their operations and therefore cannot adjust to a season of use change. This variability precludes any meaningful attempt to predict specific impacts to ranchers at the broad scale.

**Comment:** The Draft EIS underestimates the importance of federal grazing land to the overall grazing industry.

**Narrative:** *A few people take issue with document statistics regarding the importance of federal lands for forage. One respondent states that overall, cattle figures used in the Draft EIS are inflated by the number of cattle in feed lots, calling into question a point in the Draft EISs that says only 1.4 percent of total forage in eastern Washington comes from federal range.*

**Response:** The Draft EIS stated that total dependency figures for federal Animal Unit Months (AUMs) may not reflect the rancher dependency on federal forage (see Eastside Draft EIS, Chapter 2, pages 180 and 181), or the importance of seasonal forage that is provided by the federal range in areas such as eastern Washington. Dependency and overall importance of federal grazing lands to the grazing industry depends on the county or area where the information is collected and the scale of the data. In general, the larger the area analyzed such as the interior Columbia Basin, the less important federal grazing land is to the grazing industry. Counties or communities with little federal land do not, in general, rely heavily on federal grazing lands. However, communities in counties that are dominated by federal land rely heavily on those lands for their grazing industry and livelihood. The Livestock Grazing subsection in the Social-Economic-Tribal section has been rewritten in the Supplemental Draft EIS to improve the clarity.

**Comment:** The Draft EISs do not adequately address the costs of livestock grazing (economic and environmental) compared to grazing fees collected.

**Narrative:** *The majority of statements related to this issue focus on comparing revenue generated from grazing fees and resource damage caused by livestock grazing. Several*



*people take issue with what they see as taxpayer-subsidized below-cost Animal Unit Months.*

**Response:** Grazing fees are set annually according to a formula established by the Congress. It is outside the scope of the ICBEMP to change the grazing fees.

**Comment:** The economic impact of grazing on the economy of the Northwest is understated in project documents.

**Response:** The economic impact of grazing on the economy of the Northwest is based on published state and federal agriculture and business statistics. The importance of federal grazing to area ranchers is determined by comparing forage consumption on federal lands to total feed requirements. Chapter 2 of the Draft EISs states that the sales of cattle raised on Forest Service- and BLM-administered land, at least in part, account for an average of two percent of total agricultural sales in the project area, but this average varies widely by subregion. Chapter 2 in the Supplemental Draft EIS has been updated and revised to improve its clarity. *(See also Restoring Rangeland Health)*

## Mining

**Comment:** The EIS should include a more extensive analysis of the effects on mining.

**Narrative:** *In the opinion of some people, the Draft EISs do not provide adequate treatment of the role of mining in the ecosystem. They want to know how mining will be affected by the selected alternative compared to other alternatives, because they feel the economic consequences of decreasing mining is not adequately discussed. They feel the Draft EISs do not disclose hidden impacts on mining in the form of increased costs, decreased access, and other limitations. They are concerned that any cut in U.S. mineral production will negatively affect the world supply and demand. Some assert that mining levels cannot be sustained if the companies are required to conduct EAWS.*

*In contrast, many others would like management direction in the EIS to prohibit mining activities on Forest Service- and BLM-administered land in the future. A few specifically request that the EIS consider underground mining as a viable option for continued ore extraction outside riparian areas. Some respondents ask that costs associated with cleanup be addressed in the EIS. Both sides feel the EIS must answer the question of who can mine, how much, and where. Many want to see strict regulations enforced on mining companies.*

**Response:** The potential effects on mining are described in the Draft EISs in Chapter 4 and in the supplementary report, *Economic and Social Conditions of Communities* (ICBEMP 1998). The administration of locatable, leasable, and salable minerals on federally administered land is governed by law and regulation. Nothing in the alternative strategies presented in this EIS would change those laws or regulations. A decision for the project would not rescind any valid existing rights to extract minerals from federally administered lands. New leasable and salable mineral extraction activities could face restrictions within riparian conservation areas in order to maintain or achieve RCA objectives. Specific effects on mining are too fine scale for this broad-scale EIS; therefore, those discussions are more appropriate to be disclosed during finer-scale environmental analyses with consideration of site-specific information.

**Comment:** Compliance with the 1872 Mining Act should be addressed in any analysis and decision concerning mining rights.

**Narrative:** *Legal aspects of mining, in particular the 1872 Mining Act, are of particular concern for respondents on the issue of the future role of mining in the region. Echoing an ongoing national debate over the past decade, some consider the laws antiquated and irrelevant, while others assert their continued viability and importance.*

**Response:** Actions taken to implement the Record of Decision will conform to the 1872 Mining Act and implementing regulations (43 CFR 3809). The estimation of effects of implementing one of the alternative management strategies (Chapter 4 of the Draft EISs and Supplemental Draft EIS) was made assuming this conformance. Specific effects of specific mining actions are evaluated through the NEPA process at the time such actions are proposed at the local level. It is beyond the scope of this EIS to change existing law or regulation pertaining to hardrock (locatable) mineral exploration and development.

**Comment:** The minerals and energy section in Chapter 2 of the Draft EISs should be amplified.

**Narrative:** *Some respondents suggest that the Minerals and Energy section of the EIS should better explain the federal policy in the 1970 Minerals and Mining Policy Act, the Forest Services Minerals Program Policy statement, and the BLM equivalent on mineral exploration and mining proposals.*

*Some note that the Eastside EIS (p. 2-177) states that "...it is difficult for the Forest Service or the BLM to prohibit*



*mining of locatable minerals on the public lands if the deposit can be profitably produced. Thus, the focus of agency efforts...is to prevent unnecessary and undue degradation...." They believe that this statement is misleading and could be interpreted as indication that the Forest Service and BLM would, if the authority existed, prohibit mining on public lands. These respondents feel that for clarity and to keep a proper perspective on possible intentions of the project, it would be helpful to state that prohibiting mining would be, at least in the general sense, a violation of the 1970 Mineral and Mining Policy Act.*

**Response:** The Bureau of Land Management and Forest Service aim to manage public lands and resources in compliance with existing laws and regulations. There is no intention to "prohibit mining of locatable minerals." The limits of Forest Service and BLM authority to regulate mining are explained better in the Social-Economics-Tribal Section of Chapter 2 of the EIS, under Land Ownership and Major Uses. Mining activities are authorized by the U.S. Mining Laws (Public Domain Lands) Act of May 10, 1872. The Supplemental Draft EIS focuses on issues to be addressed at the broad scale. Because of this refined focus, the minerals and energy section has not been expanded.

**Comment:** Delete road reclamation from standard AQ-S19.

**Narrative:** *Some respondents think standard AQ-S19 is superfluous because they believe requirements for reclamation and revegetation of mining disturbance, including roads, are provided in other federal and state regulations. Therefore, they feel that road reclamation should be deleted from this standard.*

**Response:** Standard AQ-S19 has not been brought forward from the Draft EISs.

**Comment:** Revise standard AQ-S20.

**Narrative:** *Some respondents feel that the last bullet of standard AQ-S20 would be more useful if it required reclamation plans and drop bonds, and if the following statement were added: "Require that reclamation bonds be established that are adequate to ensure that the reclamation plans are implemented completely."*

**Response:** Federal regulation provides that no mining operations which is conducted under a notice or a plan of operations shall be initiated until the operator or mining claimant provides a certification that a financial guarantee exists to ensure perfor-

mance of reclamation. The financial guarantee must be sufficient to cover 100 percent of the costs of reclamation.

**Comment:** Revise the heading in Minerals section of Chapter 4.

**Narrative:** *One respondent noted that on pages 4-175 to 4-178, Effects on Permitted Mineral and Energy Operations, the main heading (Locatable Regulations) seems to indicate the Forest Service and BLM can approve operations when, in fact, they can not permit them. This should be corrected.*

**Response:** Permitted activities on Forest Service- and BLM-administered land include the exploration and development of minerals and energy resources. These activities are analyzed and approved through the appropriate National Environmental Policy Act analysis document. Annual operations are approved by the local unit through the approval and acceptance of Annual Operating Plans. For clarity the heading has been changed in Chapter 4 of the Supplemental Draft EIS.

## Fossil Fuels

**Comment:** The EIS should consider the environmental and economic effects of alternative sources of energy.

**Narrative:** *Some state that alternatives to fossil fuels, such as wind and solar power, are numerous and should be considered prior to oil and gas development. They want the EIS to include analysis of potential offsets of impacts from alternative energy development in any assessment of effects of the selected alternative on decreasing opportunities for oil and gas development.*

**Response:** An analysis of effects from alternative energy development is outside the scope of this EIS. As noted in the Draft EISs, these types of activities, in general, are initiated by private entities, not by the land management agencies (Eastside Draft EIS, Chapter 4, page 175). When proposed, the local administrative unit can consider these types of issues if identified by the public response to a fine-scale proposal.

**Comment:** Oil and gas drilling have negative effects on the environment and should not be allowed in the selected alternative.



**Narrative:** *A majority of comments addressing oil and gas exploration expressed opposition to it in specific locations, including: Yellowstone and Glacier national parks, the Bob Marshall Wilderness Complex, and the Rocky Mountain Front in Montana. These respondents argue that such areas are more important ecologically than as sources of fuel.*

**Response:** The EIS does not propose to change existing land allocations or permits. Where appropriate on Forest Service- or BLM-administered lands, oil and gas exploration are not precluded by any of the alternatives proposed in the Draft or Supplemental Draft EISs. Most of the areas mentioned, including Yellowstone and Glacier National Parks, are not in the project area, nor under the jurisdiction of the Forest Service or BLM.

**Comment:** **The EIS should reconsider the need to balance utility corridors with environmental protection.**

**Narrative:** *A few respondents mention that utility corridors for transmission of energy or transport of fuels can and should be conducted in manner that balances utility needs with protection of the environment and maintenance of ecological integrity.*

**Response:** The effects of utility corridor maintenance and protection of the environment are issues better addressed in site-specific analysis. The transmission of fossil fuels and electric energy would need to be considered, when proposed, at the mid- to fine-scale in an appropriate National Environmental Policy Act analysis document.

## Amenity-Based Employment

**Comment:** **The selected alternative should emphasize protection of amenity-based economies, not just commodities.**

**Narrative:** *Some believe that more emphasis should be placed on non-commodity economic values, such as clean water, clean air, flood control, natural insect predation, and climate regulation. A few think that the Draft EISs do not do a sufficient job of assigning values to non-commodities. Others believe a dollar value cannot be placed on non-commodities, but that wilderness and roadless areas are more valuable spiritually and historically. Some assert that it is this beauty that draws other businesses into the Northwest.*

*Comparing employment in recreation to that in extractive industries, many respondents assert that more jobs are found in recreation. They believe the EIS, especially Alternative 4, should focus on this information and not emphasize future employment opportunities in extractive industries. They believe that recreation will offer more economic stability in the long-run.*

**Response:** The Supplemental Draft EIS addresses an integral part of an overall social-economic-tribal strategy for the interior Columbia River Basin which links land and resource management actions and strategies with social and economic needs. The strategy contains three components: products and services from forest and range lands; organizational support for economic and social need for communities and cultures; and support economic adjustment initiatives.

The Draft EISs attempted to place a measurement on amenity values (Eastside Draft EIS, Chapter 4 pages 187-189) within the context of "Quality of Life." As noted in the narrative, placing a quantifiable number to uses that intrinsically have a different value to each person is difficult. The Supplemental Draft EIS has revised the estimates for recreation and jobs associated with recreation values. The Supplemental Draft addresses the values of unroaded lands relative to certain aquatic and terrestrial values, thus addressing a subset of ecological and social values.

**Comment:** **The EIS should reanalyze the economic values of recreational opportunities in the project area.**

**Narrative:** *While some respondents feel that the values of recreational opportunities were reasonable, others perceived that they are highly inflated. The latter's perception is that jobs in extractive industries are high-paying, year-round, stable positions, which pay significantly better than jobs in recreation and have higher multipliers. They believe that jobs in the recreation sector are seasonal, low-wage positions. One respondent feels that Alward's recreation response coefficients probably overstate recreation jobs, and that the impact analysis should be redone using a methodological approach that is more accurate and reliable.*

*Some feel that classifying any business as strictly recreation-oriented ignores the fact that many of the business's customers may be timber-dependent, thus making the 'recreation' business timber-dependent as well. Others are concerned that the proposed National Roads Policy will block many projects that could help areas move to a recreation-based economy. While comparing recreation-based jobs to extractive industry-based jobs, some feel that*



*the Draft EISs do not consider extractive-industry benefits such as health and retirement, which are said not to be offered by the recreation industry. Some assert that a shift to a recreation-based job market basin-wide will not benefit or support small eastside towns where there is no recreation available.*

**Response:** Based on further review and analysis in response to comments, the estimates of recreation value and of jobs associated with recreation activities have been revised, and are presented in the Supplemental Draft EIS.

## Receipts to Local Government

**Comment:** The EIS should address potential impacts of decreases in Payments in Lieu of Taxes (PILT) and 25 percent funds and how these will be offset.

**Narrative:** *Some respondents note that many small communities in the interior Columbia River Basin rely in part on payment in lieu of taxes (PILT) or the 25 percent fund to help finance school budgets and road projects. Some observe that these payments have been historically tied to timber outputs; they believe that if the selected alternative decreases extractive activities, communities will lose vital funding.*

*Others suggest that the project should identify alternative funding resources for the PILT and 25 percent fund in the event that commodity extraction on federal lands decreases. One person believes this funding at a minimum should be separated from forest and rangeland management.*

*With regard to recreation use as a potential alternative source of school and road funding, some do not believe recreation can offer a viable alternative to timber receipts unless very high fees are charged for recreational use on Forest Service- and BLM-administered lands. Others fear that higher taxes will be imposed to cover the decrease in funds, and that some retired people will be unable to maintain their standard of living.*

**Response:** The issue of PILT payments and the 25 percent fund is currently under discussion within the Administration and Congress. The final outcome will be determined through congressional action and presidential approval of any final bill addressing these payments.

# Social Systems

## Quality of Life

**Comment:** The EIS should address how project direction will mitigate adverse effects of the selected alternative on the quality of life and cultural integrity of resource-dependent communities.

**Narrative:** *Responses regarding social systems reveal a variety of issues concerning quality of life. Some individuals feel the project threatens the cultural integrity of their resource-dependent communities with its perceived potential to decimate the culture and traditional family values developed over several generations. These individuals feel they will lose not only jobs, but also the heritage and culture that defines their sense of identity and community. Some respondents say that the culture of their communities developed around resources, such as timber and mining, over a century ago, and that locking away these resources will destroy their way of life and prevent their children from partaking in their culture.*

**Response:** The Supplemental Draft EIS attempts to address an integral part of these concerns with an overall social-economic-tribal strategy for the interior Colombia River Basin. This broad-scale strategy links land and resource management actions and strategies with the social and economic needs. The strategy contains three components: products and services from forest and range lands; organizational support for economic and social needs for communities and cultures; and support economic adjustment initiatives. Finer-scale effects will be analyzed and disclosed during finer-scale environmental analyses.

**Comment:** The selected alternative should protect areas that provide spiritual values which are important to the public.

**Narrative:** *Some respondents want natural areas preserved for their spiritual integrity. Other respondents suggest that spiritual needs are an aspect of each individual's quality of life and that the environment is essential to fulfill these needs, not only on an individual level, but also on family and national levels. They see natural areas as offering people a sense of identity in relation to the world and a connection with other species. One person offers the opinion that natural areas even influence those who cannot physically appreciate their*



*beauty, but who dream of one day visiting these areas. Most respondents to this issue say that monetary values cannot measure or compare to spiritual values. Many respondents say that the social assessment does not adequately evaluate the effects on local communities with regard to spiritual values and other social effects.*

**Response:** Many sites in the basin have special significance for historical, cultural, symbolic, or other reasons. Before ecosystem management actions are taken in areas containing such sites, the Supplemental Draft EIS provides direction for efforts to be taken to ensure that groups with attachments to these sites are informed and involved in decisions regarding mitigation efforts to maintain the integrity of these sites.

The Social-Economics-Tribal Component of the management direction is designed to support the economic and social needs of people, cultures, and communities of the interior Columbia River Basin. One of the major areas of focus is a process for collaborating with stakeholders, recognizing that success in achieving the social and ecological goals of ecosystem management depends on effective collaboration.

**Comment:** The EIS should do a better job of incorporating the social element and disclosing the social impacts of the alternatives.

**Narrative:** *Some respondents disagree with the Draft EISs' reliance on social desires and values to guide management in the project area, citing ambiguous and confusing passages and the unscientific basis of changeable values and desires, and management practices.*

*One group suggests that the project does not successfully incorporate the social element of the project. Their suggestions include establishing social characteristics guidelines in the document that will be monitored; they believe that if management actions do not meet these guidelines in a particular area, those actions should be adapted. Some believe that social, not economic, policy should be the driving force behind the project.*

*Some people feel the documents do not provide enough information regarding the social effects of implementing the EIS, including specific questions on how the selected alternative will be implemented, what economic impacts will result, and the economic and financial feasibility.*

**Response:** The relationship of social and economic systems to management of Forest Service- and BLM-administered lands is documented in the *Scientific Assessment* (Quigley and Arbelbide 1997) and discussed in Chapter 2 of the Supplemental Draft EIS. The Social-Economic-Tribal Component of the direc-

tion — which is designed to support the social and economic needs of people, cultures, and communities — is only one of four major components to the ICBEMP alternatives, equal to and integrated with landscape, terrestrial species, and aquatics components. The social impacts of the alternatives are disclosed in Chapter 4, based on the findings of the Science Advisory Group with additional analysis and interpretation provided by the EIS Team.

Recognizing that social and economic effects will occur upon implementation of a decision, we have attempted to clarify the implementation process, showing where collaboration and public involvement will take place. Given the scale of the alternatives, it is not possible to predict specific social or economic impacts on specific individuals or groups of people. The understanding of these effects will be disclosed through the local NEPA analysis processes for implementing actions at the local level.

## Recreation

**Comment:** The EIS should address the effects of road closures on access for recreational opportunities.

**Narrative:** *A substantial number of people express concern that road closures will affect their ability to access public lands for recreation and traditional activities, such as collecting berries or firewood, hunting, fishing, hiking, mountain biking, and motorized vehicle use. Others indicate that as access becomes limited, user concentrations will increase in areas that permit motorized recreation, thereby diminishing their enjoyment of outdoor recreation.*

*Some allege that the EIS did not fairly analyze the benefits that motorized use offers to both users and local economies. They feel the preferred alternative unfairly stresses wilderness recreation over motorized recreation, which they feel leads to road closures and limited access. Others feel that the project does not adequately disclose the detrimental impacts of motorized recreation on the land.*

**Response:** Specific decisions on which roads to close and how to close them will be made by local decision makers during finer-scale environmental analyses. The reasons to close or open roads are varied, including needs for managing wildlife habitat, fire protection, recreation access, permittee access, road maintenance, and short-term needs like timber hauling. It is not the project's intent to make site-specific decisions on changes in road use in this EIS. Rather, we have identified the need for some road closures, in particular to improve aquatic habitat and water quality. Where these needs occur, road management concerns



would be addressed in site-specific analysis. The intent of management direction regarding roads is described in Chapter 3.

Effects of the alternatives on recreation are presented in Chapter 4. Changes in roads—including conditions, locations, and access—were not modeled at the broad scale due to data limitations, so their specific effects on recreation supply and use patterns cannot be demonstrated. Changes in recreation supply and expected use will be estimated and the effects evaluated at finer scales during the step-down process.

**Comment:** The EIS should account for the contradictions regarding recreation jobs, future receipts, and road closures.

**Narrative:** *Some state that roads are vital for recreation and management of public forest and rangelands. Some people note that recreation jobs would be lower under Alternatives 1 and 5 because of more road construction, yet as the population ages, lower road densities may decrease recreation activity. Others point out that the economic analysis indicates that in the next 50 years the three most highly valued uses will be motor viewing, day use, and trail use, all of which require roads. They see this as a contradiction to the projections for developed recreational needs.*

*Some assert that this kind of access is vital for maintenance of local economies through a transition from extractive to recreation-based employment. They hold that a decrease in the number of roads can serve only to limit recreational opportunities, an amenity they believe is integral to development of a recreation-based economy.*

**Response:** The issue of roads is complex. The overarching intent for roads management within the project area is to progress, in a staged approach, toward a smaller transportation system that can be effectively and efficiently maintained into the future with minimal environmental impact. The challenge is to design and maintain a road system that provides the benefits of access (including jobs related to recreation) but minimizes adverse road-related effects on other resources, such as water quality, fish, and wildlife. Step-down processes are provided for in the EIS (roads analysis, Subbasin Review, EAWS) to guide local managers in making decisions about which roads to close, improve, or build.

Effects of the alternatives on recreation are presented in Chapter 4. Changes in roads—including conditions, locations, and access—were not modeled at the broad scale due to data limitations, so their specific effects on recreation supply and use patterns cannot be demonstrated. Changes in recreation supply and

expected use will be estimated and the effects evaluated at finer scales during the step-down process.

**Comment:** The EIS should better analyze the positive and negative effects on recreation from other management activities.

**Narrative:** *Some people note that decisions made about other land management activities, such as timber harvest, grazing, mining, and noxious weed control, will affect recreation. They want to see recreation management based on impacts from other activities.*

*One person, however, suggests that tourism and timber harvest do not adversely affect each other in the Flathead Valley, and that both activities are valuable to the Flathead Valley and can co-exist. Some point out that forest management provides the necessary recreational resources for tourists to enjoy.*

*Some respondents feel that the Draft EISs do not provide enough details regarding the recreational impacts of each alternative. They feel that the EIS should conduct the recreational analysis at a regional, not a site-specific, level. Other people assert that the Draft EISs do not accurately portray the various economic values of recreation or effectively address multiple recreational use. One person pointed out that the Draft EISs do not distinguish between winter and summer recreational activities, which they say have different environmental impacts.*

**Response:** Desired outcomes, not specific management activities, are described in the objectives and standards presented in the Supplemental Draft EIS. Providing a balance, and addressing conflicts, among a variety of uses is more appropriately addressed through analysis at the mid- and fine-scale for projects at the local administrative unit. Effects of the alternatives at a broad scale are provided in Chapter 4.

**Comment:** The EIS should use a different methodology than the 'willingness to pay' concept to determine the value of recreation.

**Narrative:** *Some believe that determining the value of recreation using the 'willingness to pay' idea is not effective. They assert that asking people how much they are willing to pay is not representative of how much they will actually pay, evidenced by a decrease in visitation at national parks. Others wonder why the Draft EISs never ask what people are willing to pay for a board of wood or the wood house in which they live.*

**Response:** Unlike developed camping and downhill skiing, much of the recreation activity occurring on



federal lands is not traded in the market place. Therefore, other methods are needed to identify its relative economic value. The willingness-to-pay methodology is one of the most tested and scientifically accepted approaches used to assign economic value to non-marketed outputs and uses. A willingness-to-pay approach is not necessary for wood or wood houses since their value is established by the actual exchange of dollars in markets.

**Comment:** The EIS should fully disclose effects of closing recreation facilities located next to water, including losses to water-based recreation.

**Response:** The Supplemental Draft EIS does not propose the closing of recreation facilities located next to water. The Supplemental Draft EIS describes desired outcomes in objectives and standards which may require a change in uses or areas where use occurs; however, these changes would be addressed specifically during mid- and fine-scale analysis.

## Human Population

**Comment:** The EIS should analyze the potential effects of increasing human populations on resources and their management.

**Narrative:** *Some people commented on human population and environmental stability and the threat of rising population growth on resource demand and use. A few respondents suggest that the Draft EISs do not adequately address the population problem or the amount of resources the future populations will require. They argue that until population growth is controlled, management plans cannot effectively sustain resources.*

**Response:** Managing population growth is beyond the scope of this EIS. However, population characterization, trends, and implications for urban-rural-wildland interface management issues are discussed in Chapter 2. The Supplemental Draft EIS in Chapter 4 provides a discussion of the effects on resources based on the alternatives being considered. The social-economics-tribal section provides a discussion of human uses on land administered by the Forest Service and BLM in the project area, using the best science available.

# Wilderness and Unroaded Areas

## Reserves

**Comment:** Opinions diverge on whether the selected alternative should include reserves or not.

**Narrative:** *Many people suggest creating biological reserves in the project area to conserve biological diversity and to maintain or restore ecological health. They argue that old-growth forests, riparian values, roadless areas, and fish and wildlife must have protection to meet the project's stated purpose and need and to protect remnants of disappearing ecosystems for future generations. Some respondents feel that the selected alternative should delineate a greatly expanded and representative reserve system. They believe that land allocations should include terrestrial reserves, watershed reserves, riparian reserves, multiple-use buffers around reserves, and matrix areas where sustainable resource production is emphasized. Some feel that wilderness areas and areas of critical environmental (a BLM designation) should be considered together rather than separately to create a comprehensive and integrated strategy.*

*A few people do not want reserves because they believe that reserves would preclude proper management for wildfires, wildlife, noxious weeds, and a predictable flow of commodities.*

**Response:** Alternative 7 in the Draft EISs described and analyzed an extensive reserve system across the project area. Designated wilderness areas throughout the project area provide for a foundation of a "reserve" concept. Changing any existing congressionally designated wilderness areas is beyond the scope and intent of this EIS.

**Comment:** Opinions diverge on whether reserves should be actively or passively managed.

**Narrative:** *Some people disagree about how to manage reserves. Some prefer a 'hands-off' wilderness management approach as opposed to ecosystem management, because many believe that ecosystem management would require*



*considerations of economic and social values in management decisions. Others feel that active restoration, such as removing roads and prescribed burning, is necessary to first return potential reserve areas to ecological integrity. Many of these respondents do not want any type of timber harvesting, mining, or grazing in these areas, and they ask non-native species be controlled to ensure that reserves function as intact natural ecosystems.*

**Response:** A system of reserves with passive management was identified and analyzed in Alternative 7 in the Draft EISs. The Supplemental Draft EIS took a different approach. Aquatic A1 subwatersheds are identified, which allow management to occur so long as they provide low risk to the aquatic and riparian resources and they meet the intent of the management objectives in the subwatershed. Aquatic A2 subwatersheds and terrestrial T watersheds allow for more restorative activities so long as they, too, meet the intent and objectives of the area. Although these areas are not reserves, they are special areas that have been identified as being important to fish or wildlife.

**Comment:** Reserves should be delineated to conserve biological diversity; opinions diverge on the size and location of these reserves.

**Narrative:** *Some feel that reserves listed in Alternative 7 are not large enough to maintain ecological integrity and are too fragmented from each other. Other areas were suggested for reserves because of their high degree of biological diversity. Some feel that reserves should be created adjacent to existing wildernesses and national parks to provide core habitat for such species as the grizzly, wolf, and salmon.*

**Response:** A system of reserves was identified and analyzed in Alternative 7 in the Draft EISs. The Supplemental Draft EIS took a different approach. It identified certain areas that are important to fish or wildlife, and those areas must remain in their current condition or be improved to a better functioning condition. Other areas have been identified as being high priority for restoration. This integrated approach of conserving some areas while restoring others is intended to promote basin-wide health and biodiversity while recognizing the dynamic nature of the lands in the basin.

The Draft EISs and Supplemental Draft EIS include direction to contribute to recovery of federally listed or proposed species, including grizzly bears and wolves, by restoring and maintaining habitat quality, quantity, and effectiveness. (See also *Special Status Species*.)

**Comment:** Standards EM-S8 and EM-S12 in Alternative 4 assert that land management can proceed outside of Category 1 subbasins in the absence of Ecosystem Analysis at the Watershed Scale. Such analysis is critical to understand environmental consequences of potential land management activities in Category 1, 2, and 3 subbasins. These standards should be modified.

**Response:** The standards requiring Ecosystem Analysis at the Watershed Scale (EAWS) have been simplified and clarified in response to comments. In Alternative S2, EAWS is required prior to planning and designing management activities where they have the potential to negatively affect threatened, endangered, or proposed aquatic species or their habitats, or the source habitats within terrestrial T watersheds that have declined substantially in geographic extent from the historical period. Alternative S3 has no EAWS "triggers" but relies upon Subbasin Review to identify priorities and schedules for conducting necessary EAWS. (See the Step Down section of the base level management direction in Chapter 3 of the Supplemental Draft EIS.)

## Wilderness Management

**Comment:** Comments diverge on how wilderness and unroaded areas should be managed in the selected alternative. Some feel that remaining unroaded areas should be kept off-limits to resource development and others believe that remaining unroaded areas should not be given wilderness protection.

**Narrative:** *A large portion of respondents on this topic appeared to use the terms 'wilderness' and 'roadless area' interchangeably, not differentiating between designated wilderness and other undeveloped lands. Many people write of the importance of living in a region with extensive wilderness opportunities and unbroken landscapes, outings in the back country, the intrinsic value of wild areas, and the importance of maintaining these places for future generations. Ensuring that such areas are adequately protected is a major concern for many respondents. Many of these people perceive wilderness as a finite resource and they aren't sure the Draft EISs do enough to protect these areas from extractive industries and pollution. Some believe that all wilderness study areas should be put off-limits to logging and mining activities. Others express strongly held beliefs that once wilderness areas are developed they can never be fully restored. Some wonder why the BLM's wilderness study areas are not mentioned in the Draft EISs.*



*Many people feel that unroaded areas provide the highest quality wildlife habitat and fisheries, and that protection of these areas should be part of the selected alternative. They feel that the agencies should review the roadless lands issue and protect them through a firm standard that accurately reflects the findings of the Assessment of Ecosystem Components (Quigley and Arbelbide 1997). They believe that the alternatives do not protect remaining unroaded areas, despite numerous references throughout both documents to the fact that unroaded areas have critical ecological importance.*

*Some would like to see a rangeland wilderness created. Another proposes creating a fish-wildlife-plant-habitat sanctuary on Forest Service- and BLM-administered lands. Others believe severe wildfires in wilderness areas could create ecosystems that are out of balance.*

*In contrast, some respondents feel the project is an attempt to create one huge wilderness area at taxpayer expense. Others assert there is little or no land left in the West that qualifies for roadless or wilderness designation. Some respondents feel that there might be an over-abundance of wilderness acreage and that some of these lands could be healthier if they were given a Restore or Produce emphasis in Forest Service or BLM land use plans. One respondent recommends that a task force be assigned to evaluate data relating to wilderness resources and whether they contribute to overall ecological integrity and socio-economic resiliency. Some assert that decisions about these lands should be made on a site-by-site basis.*

**Response:** The Draft EISs do not propose to change or adjust any existing wilderness or roadless areas and do not recommend to designate new "wilderness areas." The agencies may decide to consider the suitability of any area for preservation as wilderness during subsequent Forest Service or BLM land use planning revision processes.

The Supplemental Draft EIS includes road direction which includes the following: "New roads into watersheds that are currently unroaded or have very few roads will be rare. New roads into such areas could occur following analysis that demonstrates that access is needed to prevent or address imminent environmental damage or provide for valid existing rights."

Aquatic A1 and A2 subwatersheds and terrestrial T watersheds as outlined in the Supplemental Draft EIS have a management intent that is focused on minimizing risks to aquatic and riparian systems (A1 and A2 subwatersheds) and terrestrial source habitats (T watersheds). Current roadless, wilderness, and wilderness study areas may be mapped as part of the A1/A2 network or T watersheds if they support

strong fish populations, terrestrial source habitats, and high native diversity and integrity. For specific information on subwatersheds and watersheds identified as A1, A2 subwatersheds, or T watersheds see the Objectives, Standards, and Guidelines section of the Supplemental Draft EIS.

**Comment:** The selected alternative should not limit inholder access to wilderness areas.

**Narrative:** *A few respondents express concern that the project could limit access to private inholdings in wilderness areas, particularly within the Frank Church–River of No Return Wilderness.*

**Response:** The Draft EISs and the Supplemental Draft EIS do not propose site-specific changes to road use or access. The detail needed to assess access to specific private in-holdings requires fine-scale analysis and is not considered in these broad-scale documents.

## **Roadless Area Management**

**Comment:** The EIS should revisit the protection of unroaded areas 1,000 acres or larger as proposed in Alternative 7.

**Narrative:** *The subject of unroaded areas is of acute interest to a large number of respondents. Asserting there are already enough roads, many people would like to see roadless areas of 1,000 acres or more put off-limits to all road building and resource extraction activity. They cite the protection of biologically diverse regions, old-growth forests, riparian areas, wildlife habitat, and fisheries as reasons for putting these places off-limits. One respondent feels that conserving remaining old-forest stands and unroaded areas larger than 1,000 acres is vague and could mean almost any management activity.*

*Many other people feel that roadless areas should not be locked up but need to be opened up to allow recreation, logging, and other economic uses. They argue that there are enough roadless areas already provided on BLM- and Forest Service-administered lands. Thus, by building additional roads it will provide access for many users who cannot access these areas by foot, such as the elderly, who need to be considered in public land management policies.*

**Response:** The Supplemental Draft EIS does not call for the protection of unroaded areas 1,000 acres or larger, because the findings in the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997) did not support such protection.



The intent of the roads management direction is to reduce new road construction from past levels. New road building could rarely occur in watersheds that are currently unroaded or have very few roads, and can only occur following roads analysis and/or National Environmental Policy Act (NEPA) analysis that considers the larger watershed context. These analyses should weigh relative habitat values and effects on species, such as anadromous fish and wide-ranging carnivores, that are potentially affected by roads against the need to address large-scale environmental damage or public safety.

The Forest Service is currently studying its national policy with regard to unroaded areas. The project's Record of Decision will require management actions to be consistent with the finalized roads policy.

**Comment:** The EIS should clarify what is meant by "natural area designation or category" (page E-2-42).

**Narrative:** *Some respondents note that Chapter 2, page 42, of the Eastside Draft EIS states that within the project area, about 28 percent of the land administered by the Forest Service and BLM is within "some type of natural area designation or category." They are dissatisfied that these "designations or categories" are not explained, and that no information is provided concerning whether the designations can easily be changed. They want the EIS to provide information on whether lands that are within a natural area category are formal designations or simply areas that have not yet been subject to alteration such as roading and logging.*

**Response:** Natural areas are defined in Chapter 2 of the Draft EIS and in the glossary of both the Draft EISs and Supplemental Draft EIS as "areas managed by various landowners that are mainly in a natural state and being managed to maintain or restore a degree of naturalness for research, monitoring, inventory, habitat protection, education, or social needs." The discussion of natural areas has not been brought forward into the Supplemental Draft EIS, because of the refined focus of the project. (See Chapter 1 for more information.)

**Comment:** Standard RM-S16 in Alternative 7 is arbitrary in that unroaded areas: (1) may not be correlated with existing high integrity habitat, and (2) unroaded areas may not contribute to other stated goals of the alternative. This and other standards that are not based on sound ecosystem management principles should be removed.

**Response:** Alternative 7 has not been revised or rewritten for the Supplemental Draft EIS. However,

some of the concepts in Alternative 7 have been brought forward to the aquatics A1 and A2 areas and the terrestrial T areas in Alternatives S2 and S3.

**Comment:** The EIS should document the methodological limitations of using non-specific survey results with regard to existence values of unroaded areas.

**Narrative:** *One respondent notes that the existence values of unroaded areas were presented, yet the Draft EISs do not reveal whether any detailed survey was used to develop this information. The respondent believes that it is well documented that the results of one survey do not transfer to other studies with any reliable level of validity. They recommend that the EIS document the methodical limitation in using non-specific survey results in the analysis.*

**Response:** The methods used by the Science Integration Team are documented in *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins*, Volume IV, Chapter 6, page 1821. They indicated that there are no estimates of the willingness-to-pay for the existence value of unroaded areas in the project area. They inferred a value from Walsh and others (1984a) and Pope and Jones (1990) which is described in Chapter 6 of the *Assessment of Ecosystem Components* (Quigley and Arbelbide 1997).

**Comment:** The selected alternative should not affect the status of inventoried roadless areas.

**Response:** The Draft EISs and the Supplemental Draft EIS do not make any specific proposals that would affect roadless areas and/or the status of these areas. This would be appropriately addressed at the land use plan level through the appropriate National Forest Management Act, Federal Land Policy and Management Act, and National Environmental Policy Act planning process (such as a forest plan or resource management plan amendment or revision).

## Road Management

### Adverse Effects

**Comment:** The selected alternative should emphasize managing roads in a manner that protects the environment, but not adopt road closure as a blanket policy.



**Narrative:** *The wishes of many who address road management are captured by the statement, "close and stop building roads." They feel that roads negatively affect the environment by causing erosion and providing access for timber harvest. Comments request decommissioning, obliteration, and revegetation of perceived unneeded or environmentally damaging roads. Some people, citing environmental concerns and what they see as the already enormous Forest Service road system, specifically ask that non-system roads be targeted for obliteration before any others, or that no more roads be built at all. Some respondents feel the EIS should also consider environmental impacts from roads on non-federal lands, with specific time lines to mitigate these effects.*

*Some say that protecting the environment is important, but that the Draft EISs only look at the worst conditions. They feel that the project should look at areas that run clean of heavy sediment with roads and maintenance in the area (such as the Yaak River). They say that these roads are used for forest protection and should be an example that road closures and obliteration are not necessarily the answer when proper management would suffice to protect the environment. Some believe a reduction in roads should occur only where adverse effects have been proven to be caused by roads.*

*Many people request that no roads at all be closed or obliterated. They believe that closing more roads would limit access for recreation, restrict Forest Service and BLM management options, or cause more environmental damage than leaving the roads to revert naturally to a wild state. A few believe that road closures have been done illegally and outside the planning process.*

**Response:** The standards in the Supplemental Draft EIS focus on reducing the negative impacts of roads. Closing roads may be one way of reducing negative effects. Better maintenance might be another way. The biggest change to the existing road system is expected in areas that are highly roaded and have high road-related risks to resource values, where action has not already been taken to address the problem. This EIS does not require closure of specific roads. Those decisions would be made at the local level with local input by local decision makers.

The overarching intent of ICBEMP roads management direction is to progress toward a smaller transportation system that can be maintained into the future with minimal environmental impact. The direction intends for the use of a staged approach that concentrates short-term efforts on reducing road-related adverse effects, while determining the long-term road system needs and locations in a manner that maintains choices for future generations. (See also *Management Access*.)

**Comment:** Scientific evidence in support of road management is flawed and should be reanalyzed.

**Narrative:** *Some respondents question definitions and scientific evidence they feel are not clear in the Draft EISs. Comments primarily focus on the Draft EISs treatment of adverse effects of roads, road construction and maintenance, road density and definitions, and road access for management. A few believe that the scientific data used by the project concerning adverse effects of roads are flawed and do not support the policies brought forward in the Draft EISs aimed at limiting construction or mitigating the impact of roads.*

**Response:** The road system on federally administered lands is extensive and diverse. New science information, particularly that generated by the Science Integration Team, indicates that roads are a significant modifier of landscapes and ecological processes. Roads are needed for public access as well as for accomplishment of many federal management objectives. The challenge is to design and maintain a road system that provides the benefits of access but minimizes adverse road-related effects on other resources, such as water quality, fish, and wildlife.

The Science Integration Team prepared a section on the influence of roads on aquatic resources in *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins*, Volume III, page 1102. Numerous studies are cited as reference.

**Comment:** The EIS should ensure that discussion of road-related adverse effects is based on actual, not extrapolated, road inventory data.

**Narrative:** *Some respondents note that standard RM-S1 states that road quality is measured at the subbasin scale; however, they believe it is well known that very little road density inventory data are available that have not been extrapolated from subsample data.*

**Response:** This standard was rewritten to clarify the intent. Roads analysis is to be incorporated into or conducted concurrently with planned Ecosystem Analysis at the Watershed Scale and/or site-specific project analysis.

Field level inventory is expected prior to implementing road restoration or other road-related activities. In some cases, finer-scale information may be desirable to address road risk and complete data gaps identified through EAWS.



**Comment:** The EIS should evaluate and disclose all direct and indirect effects of broad-scale decisions with respect to road management, including impacts of changes to roads.

**Narrative:** *A respondent points out that the first paragraph under the Roads Standards subhead (p. 3-78, Eastside Draft EIS) states that "reducing these effects of roads through standards may cause additional effects that would be considered at the watershed or project scales." The respondent believes that the EIS should disclose these effects.*

*Some respondents feel that the statements (page 3-78 and 3-79, Eastside Draft EIS) that impacts of changes in roads will be addressed at the site-specific level are contrary to the intent of the National Environmental Policy Act (NEPA). They feel this section should be revised to indicate that impacts of changes in the road system should be addressed in this document, and the impact analysis should do so.*

**Response:** The Supplemental Draft EIS standards and objectives describe desired outcomes, and focus on the broad-scale management of lands administered by the Forest Service and BLM in the project area, not on specific levels and locations of management activities. Predicting effects of these fine-scale impacts is better addressed through NEPA analysis of specific proposals on local administrative units.

## Road Construction and Maintenance

**Comment:** The selected alternative should state where funding for road maintenance, obliteration, and closures will come from.

**Narrative:** *The cost of maintaining, closing, and obliterating roads is a concern to some people. They suggest that logging companies be made responsible for reclamation of access roads after they are finished using them. Others suggest imposing user fees and letting the people who are using roads pay for the upkeep. Because of the shift away from extractive industries to recreation, some people ask that the EIS clearly state who will be responsible for costs associated with road construction and maintenance.*

**Response:** The Supplemental Draft EIS identifies the program costs for management activities, including such actions as road maintenance, obliteration, and closures that may result as from the management direction. Additional costs are identified as general program costs and increases to accomplish program activities. Program costs, including road maintenance, obliteration, or closures, are evaluated by the

Congress in the normal course of the appropriations process.

Implementation of the Supplemental Draft EIS restoration actions and activities will come from three types of funding sources: redirecting existing capability from current budgets (which will require Congressional approval), new funding requested and approved by the Congress, and developing partnerships with state, private and other federal agencies within the basin.

**Comment:** The EIS should remove standard RM-S9 and other standards that cause unnecessary analysis, implementation delays, and management uncertainty.

**Narrative:** *A respondent notes that standard RM-S9 requires more intergovernmental coordination for specified road construction, but does not provide a process. They believe the process is already part of National Environmental Policy Act procedures, and that a separate coordination effort for road construction would cause unnecessary analysis leading to implementation delay and management uncertainty.*

**Response:** The Supplemental Draft EIS calls for a roads analysis to be incorporated into or conducted concurrently with planned Subbasin Review, Ecosystem Analysis at the Watershed Scale and/or site-specific NEPA analysis. Roads analysis is the tool to assist land managers in balancing road system objectives and provides the context and information needed for assessing tradeoffs and risk prior to decision making.

In the development or revision of Access and Travel Management Plans, the intent is for the public, including state, county, and tribal entities to be involved in the process.

**Comment:** Roads standards RM-S9 and RM-S8 should be clarified and revised.

**Narrative:** *Some people feel that Standard RM-S9 is inconsistent because it states that existing transportation networks will be used, then states "if new roads are proposed...." They think this standard also is inconsistent with objective RM-O3 and standard RM-S8, which call for reduction in road miles. They want standard RM-S9 to include a provision to close an equal length of old roads when new roads are constructed, to assure no net increase and support the accomplishment of this objective.*

**Response:** Road direction in the Supplemental Draft EIS has been modified to eliminate conflicts and



clarify the intent. The overarching intent of the roads management is to progress toward a smaller transportation system that can be maintained into the future with minimal environmental impact. The direction intends for the use of a staged approach that concentrates short-term efforts on reducing road-related adverse effects, while determining the long-term road system needs and locations in a manner that maintains choices for future generations. New road building should rarely occur in watersheds that are currently unroaded or have very few roads and can only occur following roads analysis and/or NEPA analysis that considers the larger watershed context. These analyses weigh relative habitat values and species potentially affected by roads against the need to address large-scale environmental damage or public safety.

**Comment:** Add “new” to clarify the intent of standard RM-S10 regarding the construction of roads and landings.

**Response:** This standard was revised and rewritten to improve clarity and intent in the Supplemental Draft EIS. Standards and objectives addressing new roads and transportation are found in the Road Management section of Base Level Direction in Chapter 3.

**Comment:** Road maintenance for the 100-year flood is not economically feasible.

**Narrative:** *Many believe that replacing culverts and bridges to withstand a 100-year flood cannot be done economically. They note that many of the accommodations were put in with an expected road life of 20 to 50 years.*

**Response:** The standard (RM-S7) has been rewritten with an emphasis on improving or redesigning existing structures that pose substantial risk to riparian conditions. Priority for upgrading would be based on risks and the ecological value of the resources affected as determined from future roads analysis.

**Comment:** Standard RM-S12 should be clarified.

**Narrative:** *Some respondents question whether Standard RM-S12 pertaining to road construction, reconstruction, and stream crossings would apply to every waterway that historically supported native fish in the planning area. It is unclear to them whether this standard requires all existing road crossings to be reconstructed to restore the stated biophysical conditions. They want the intended physical extent of this standard to be clarified.*

**Response:** The standard (RM-S12) has been rewritten to clarify its intent. The standard is meant to pertain to new construction or reconstruction at the time those actions are being considered during site-specific analysis and implementation.

**Comment:** Standard RM-S13 should recognize that preventing sediment delivery is not possible. The EIS should replace “prevent” with “minimize.”

**Response:** This standard has been rewritten to be an objective with an emphasis on “avoiding” unstable or potentially unstable lands.

## Road Density and Definitions

**Comment:** The road density criteria should be clarified in the EIS and the EIS should clearly define what a road is and reinventory the project area using this definition.

**Narrative:** *Many people assert that road density standards are misguided. These respondents are shocked that roads do not have to be counted if they are blocked from entrance by a gate or water-bar. According to them the science used to determine road density standards is lacking in credibility with no consideration of local wants or needs.*

*Some express doubt that any policy regarding density standards or road management in general can be completed without a clear and unambiguous definition of “road.” They say that in the absence of such a definition, a road can be anything from a deer trail to an Interstate highway. Several respondents cite the official definitions in the Forest Service Manual and say the Draft EISs do not even mention these definitions.*

*One respondent feels that the Draft EISs do not mention forest roads or forest development roads. Some specifically request a new inventory of all roads in the region, not just Forest Service and BLM roads, because they feel that no differences exist between federal and other roads.*

*Some believe that the allotted 2–3 weeks to complete the systematic Road Condition/Risk Assessment is not long enough.*

**Response:** The project developed a predicted road density GIS layer because a continuous roads layer was not available across the basin. The predicted road density classes were derived using a statistical ruleset based on several data sources such as: management area classes, ownership, wilderness areas, a



mid-scale subsample of roads, and United Parcel Service (UPS) roads. This data layer was developed for use at the broad scale and is not intended to be a substitute for actual roads data.

Specific decisions on which roads to close and how to close them is being left to local decision makers. It is not the intent to make site-specific decisions on changes in road use in this EIS. Roads analysis will be incorporated into or conducted concurrently with planned Subbasin Review, EAWS, and/or site-specific project analysis.

The road definitions have been revised for the Supplemental Draft EIS Glossary.

**Comment:** The EIS should identify road densities throughout the region.

**Response:** The Supplemental Draft EIS does not identify road densities in specific areas across the interior Columbia River Basin. The intent of the road management direction is to reduce new road construction from past levels. The direction intends for the use of a staged approach that concentrates short-term efforts on reducing road-related adverse effects, while determining the long-term road system needs and locations in a manner that maintains choices for future generations. The biggest change to the existing road system is expected in areas that are highly roaded and have high road-related risks to resource values, where action has not already been taken to address the problem. New road building should rarely occur in watersheds that are currently unroaded or have very few roads.

**Comment:** Chapter 2 of the Supplemental Draft EIS should better specify the range of road densities in watersheds and discuss in greater detail the implications of high road densities which occur in many watersheds within the project area.

**Response:** Implications of roads and road densities are discussed throughout Chapter 2 in individual sections as appropriate, and discussed in detail in the Factors Influencing Ecosystem Health Section.

**Comment:** The footnote on page 211 of Chapter 3 of the Eastside Draft EIS is inadequate. It should refer to the page where the Road Density Class definition is spelled out.

**Response:** It is not feasible to provide cross references to specific page numbers in a large document such as the EIS because page numbers are not final-

ized until the entire document is ready for printing. Referrals to other sections in the EIS have been improved to include chapter and section.

**Comment:** Road density standards and objectives should be replaced with direction to use local planning processes and decisions.

**Narrative:** *Some people note that extensive road closures are proposed with the preferred alternative; they feel this decision is counter to the rationale for road management (Eastside Draft EIS, p.3-167). They want road density objectives and standards to be removed and the local planning process for Access and Travel Management be used as outlined in RM-S4.*

*Some people feel that Standards RM-S8, RM-S9, and RM-S15 (which state that no new roads can be constructed in areas with less than 0.7 miles of road per square mile of land to areas with more than 1.7 mi./sq. mi.) are examples of site-specific, micro-management that allows for input only as to which roads to close, not if they should be closed. They think these site-specific standards should be made into guidelines that local land managers can use to make local management decisions in consultation with local constituents.*

**Response:** Road density objectives and standards have been replaced by objectives and standards for conducting roads analysis (to systematically and objectively evaluate road condition and risk) and for developing and/or revising access and travel management plans (to address risks identified during roads analysis). Specific decisions on which roads to close, improve, or build would be left to local managers.

**Comment:** A percent increase should be used in standard RM-S15 rather than the artificial road density classes.

**Response:** Standards and objectives specific to road density levels were not brought forward to the Supplemental Draft EIS.

**Comment:** The EISs should be consistent with the Forest Service's National Roads Policy.

**Narrative:** *Some respondents feel that the implementation of the project should coincide with the ending of the national 18-month moratorium on road-building in unroaded areas. Others believe at least one of the alternatives should include the proposed road moratorium. They want to know how the EIS will implement restoration with the land "locked up" by the moratorium.*



**Response:** The National Roads Policy draws directly from science that has been used by the Forest Service and BLM to develop the management direction in the Supplemental Draft EIS, and complements the ideas and intent of the Supplemental Draft EIS. The project's Record of Decision will require management actions to be consistent with the finalized roads policy.

**Comment:** The addition of the words 'when feasible' make standard RM-S9 meaningless as a required action.

**Response:** This standard was not brought directly forward from the Draft EIS. In the Supplemental Draft EIS, use and maintenance of existing transportation networks is addressed through objectives and standards in the Roads Analysis section of Base Level direction of Chapter 3.

## Management Access

**Comment:** The selected alternative should not limit management access by road closures.

**Narrative:** *Roads are vital for the management of the forests, many assert. They do not want road closures. Without roads, they feel, the forest is at risk from fire, insects and disease. Some suggest keeping roads, but limiting access especially during the muddy season. Others feel that management activities should be limited to areas with existing roads.*

**Response:** The EIS does not specifically require closure of any roads. Those decisions will be made at the local level with local input. The standards in the Supplemental Draft EIS focus on reducing the negative impacts from roads. Closing roads may be one way of reducing negative effects. Better maintenance might be another way. The biggest change to the existing road system is expected in areas that are highly roaded and have high road-related risks to resource values, where action has not already been taken to address the problem.

The overarching intent of the roads management is to progress toward a smaller transportation system that can be maintained into the future with minimal environmental impact. The direction intends for the

use of a staged approach that concentrates short-term efforts on reducing road-related adverse effects, while determining the long-term road system needs and locations in a manner that maintains choices for future generations. (*See also Adverse Effects.*)

**Comment:** Standard RM-S8, to reduce roads in areas of high and extreme density, should be rewritten or deleted.

**Narrative:** *Some respondents believe that standard RM-S8 cannot be achieved because of the low levels of vegetative management proposed under most alternatives and lack of appropriate funding. Some believe that standard RM-S8 inappropriately moves away from road-related effects as the measurement. They feel that potential conflicts in collaboration could arise if local decisions to leave important roads open prevent federal managers from meeting density requirements. Some note that standard RM-S8 aims to reduce road miles through permanent closures, but they feel that no standard is really in place to make this happen and a permanent closure is not defined.*

**Response:** This standard was not brought forward from the Draft EIS. The Supplemental Draft EIS does not specifically address road density. Several standards and objectives in the Road Management Section of Base Level direction in Chapter 3 are intended to maintain a road system that provides access but minimizes adverse road-related effects on resources such as water quality, fish, and wildlife.

**Comment:** Standard AQ-S44 should be revised because it is not achievable.

**Narrative:** *Some people note that standard AQ-S44 requires adjustments or elimination of leases, permits, rights-of-way, and easements that are inconsistent with or prevent attainment of RMOs. They feel this would result in relocation or closing of state highways and special use roads, which they believe is not achievable.*

**Response:** The standard has been modified to reflect the limited authority the land management agencies have in achieving RCA objectives where valid existing rights are present. In some cases, however, the agencies do have the authority to require reasonable conditions to minimize the impacts of certain uses. Those specific requirements would be determined at the local level by local decision makers.



# Cultural Resources

## Inventory and Protection

**Comment:** The selected alternative should provide better objectives and standards for survey and analysis of cultural resources, including improved coordination with the region's tribal governments, and a regional or landscape-scale perspective.

**Narrative:** *Those who responded to the cultural resource sections of the Draft EISs are interested in continued preservation of known cultural sites and actions to locate and preserve new sites. These respondents object to what they see as a wealth of information on cultural resource management, and they ask for more analysis and information regarding appropriate management of the remnants of our past.*

*Some people hope the selected alternative will provide more opportunities for tribal management of artifacts from Native American cultures, because they believe that better cooperation between federal and tribal governments will play an increasingly vital role in preserving the history of humans in the basin. In particular, they state that 'cultural resources' include traditional cultural properties and settings currently in use, not just the remains of past activities.*

*A few respondents believe that the paradigm underlying cultural resources sections of the Draft EISs are too antiquated and narrow in geographic scope, because human activity in the past encompassed landscapes across the entire region. They feel that the EIS should not only include protection of traditional cultural resources sites and historical trails and travel routes, but should also address the importance of these sites at a regional scale. They argue that the current emphasis on protecting sites, although in compliance with relevant laws, insufficiently captures their scientific value. They believe that quality assessments of past interactions of humans and the environment will emerge only from a regional perspective.*

**Response:** The EIS provides broad-scale management direction to address resource management and protection, which includes cultural resources, at the landscape level across the project area. Objectives and standards are intended to be responsive to many tribal issues, such as requiring collaboration and consultation with tribal and local governments and

communities in the development of Forest Service or BLM management activity. This should result in the identification and protection of cultural resources. Additionally, the Social-Economics-Tribal management direction targets tribal communities for employment and contract opportunities, as well as cooperative management opportunities; the management of cultural resources might be one of these opportunities.

**Comment:** The EIS should better analyze the effects of recreation and extractive activities on cultural resources.

**Narrative:** *Several respondents ask that the EIS not restrict analysis of cultural resources to impacts from traditional resource extraction (such as timber harvest), but extend the analysis to the impacts of other activities, such as recreational use and livestock grazing. These respondents feel that although many of these activities currently require analysis under cultural resource laws, agency response has inadequately accounted for negative impacts. One person asserts that livestock grazing on prehistoric sites has destroyed cultural resources directly by trampling or indirectly through soil disruption and resulting erosion. This person argues that management for rangeland health can further harm artifacts and archaeological sites. Water developments, altering fencing patterns, dishing and seeding are a few of the activities they say are resulting in ground disturbance and destruction of cultural resources.*

**Response:** Numerous laws, policies, and regulations already provide direction and/or guidance to federal land managers on the importance of protecting cultural resources. The direction in this Supplemental Draft EIS relative to tribes references cultural and heritage resource laws, as well as emphasizes and directs tribal consultation in agency planning and decision-making processes. Further, direction reflects federal legal responsibilities to both tribes and American Indian people as expressed through treaty language, federal laws, executive orders, or federal court judgements. Objectives and standards require a government-to-government relationship and consultation and collaboration with American Indian tribes and require agencies to incorporate into federal land management how places on the landscape are valued by American Indians. More specific effects on cultural resources, such as effects from recreation and grazing, are more appropriately determined through the step-down processes (Subbasin Review, EAWS, programmatic planning processes, and site-specific NEPA analysis).



# Tribal Rights and Interests

## Treaty Rights and Federal Trust Responsibilities

**Comment:** The EIS should recognize and ensure protection of tribal rights and interests such as hunting, gathering, and fishing.

**Narrative:** *Many respondents, especially those representing tribal governments, note that rights guaranteed under treaties with American Indians protect tribal rights or interests and traditional uses such as hunting, gathering, religious, or cultural practices. They want to ensure that the EIS adequately addresses environmental concerns in light of these rights, and that it mitigates potential conflicts. Many of these respondents feel the Draft EISs do not do this, citing what they view as not fully considering the importance of maintaining tribal rights and interests. They ask for clear, accessible evidence of collaboration and consideration of their concerns. Some question why there are differences in levels of consultations with tribal governments by alternative. They assert that tribes are not always informed of projects in a timely manner, and that federal agencies should contact tribes more often.*

**Response:** One of the primary issues common to nearly all 22 potentially affected tribal governments is harvestability of important aquatic and terrestrial species, such as salmon, mule deer, and camas. These species, besides being associated with a number of the tribes' off-reservation reserved treaty rights and traditional uses, are integral to the culture of many of the tribes within the project area.

One of the five goals developed for the Draft and Supplemental Draft EISs, is to "Manage natural resources consistent with treaty and trust responsibilities to American Indian tribes". One of the objectives in Chapter 3 requires the agencies to establish and/or maintain a government-to-government relationship with federally recognized tribes and to consult and collaborate with affected tribes when developing and/or implementing land management decisions, actions, and/or policies that may affect treaty rights and tribal culture and practices. Consultation is intended to reflect the governmental status of the tribe and consideration of their treaty. One standard requires development of a protocol for government-to-government consultation to ensure opportunities

for effective tribal participation in decision making. Another standard requires the agencies to be aware of tribal management efforts and work cooperatively with them and states where tribes regulate hunting, fishing, and gathering activities of tribal members.

Social-economic direction recognizes and provides for consideration of subsistence and treaty uses; and emphasizes tribal communities as economically specialized and isolated communities. Additionally, high restoration priority subbasins were selected based, in part, on tribal restoration priorities which emphasize proximity to reservations and opportunities to address resources important to tribal rights and interests.

**Comment:** The EIS should reflect extensive collaboration and coordination with tribes and describe how federal trust responsibilities will be met.

**Narrative:** *Some people feel the project has made considerable progress in explaining the extent to which the trust responsibilities of the U.S. government are carried out by federal natural resource agencies. They believe that successful implementation of ecosystem-based management must protect the values and needs of American Indians. These respondents perceive their concerns as the most critical ones in the project, and they believe that federal agencies should make a commitment at the highest level to resolving tribal issues. One respondent wrote, "The Indian Nations can identify their cultural values and needs. These can be considered in the collaborative planning process for implementing ecosystem management." The respondent notes that the project team has made an effort to reach out to tribes and improve government-to-government consultations.*

*Others suggest that to ensure collaboration the EIS should develop more detailed objectives and standards guiding tribal involvement in land management planning. They feel that the EIS should specify the process for developing the protocol and deadlines for completing the process. They also want the EIS to incorporate stronger measures for contributing to recovering terrestrial, aquatic, and plant species important to American Indian tribes.*

**Response:** Objectives and standards are found throughout this EIS that are responsive to the breadth of tribal issues. While this project does not attempt to define the legal obligations of the Forest Service and BLM under the federal trust responsibility, the direction in this EIS relative to tribal governments reflects a commitment, whether as a legal obligation or a matter of policy, to address as fully as possible tribal concerns and interests.



Direction includes requirements for the Forest Service and BLM to consult and collaborate with affected American Indian tribes when developing and implementing land management decisions, actions, and policies that may affect the rights and interests of tribes, and the socio-economic well-being of tribal people. Direction requires the agencies to use tribal tradition-based knowledge and expertise when collaborating with affected tribes during planning and decision-making processes; to work with tribes to develop a protocol for government-to-government consultation; and to initiate a Memorandum Of Understanding (MOU) with appropriate state, county, and tribal elected officials regarding offering advice and recommendations to Forest Service and BLM decision makers. Based upon tribal comments, substantive consultation is defined in the EIS, which includes conflict resolution. Direction further stipulates the intent to maintain and restore aquatic and terrestrial habitat quality and quantity to support harvestable plants, fisheries, and aquatic and terrestrial species.

**Comment:** The EIS should include an economic analysis of potential impacts on affected tribes.

**Narrative:** *The Confederated Tribes of the Umatilla Indian Reservation (CTUIR) feel that the Draft EIS economic analysis dismisses the economic impacts on affected tribes, focusing instead on non-Indian communities. They allege that the CTUIR requested that the EIS Team conduct an economic analysis of their interests but were told that the team could not complete such an analysis, only to release an analysis of non-Indian communities.*

**Response:** The Science Integration Team attempted a prototype economic analysis in partnership with the CTUIR community during the main phase of the *Scientific Assessment*. Although that particular analysis did not reach conclusion because of concerns raised by the tribes and deadlines for submission of data into project findings, it was determined such analyses are appropriate and should be conducted at the mid- or fine-scale level of analysis.

The development of the *Economic and Social Conditions of Communities* (ICBEMP 1998) was directed by the Congress in Section 323 of the Department of the Interior and Related Agencies Appropriations Act of 1998 (Public Law 105-83). The study attempted to recognize the economic importance of federal lands to American Indians by analyzing industry specialization for communities on or near reservations. Because this sort of economic analysis poses limits relative to effects on individual communities, and because tribes

and American Indian people depend on public lands for myriad uses not covered under an industry specialization analysis, management direction also focuses on other areas important to tribes. Subbasins on or near reservation lands, that include restoration opportunities for resources and values important to the rights and interests of tribes directly influenced the selection of high restoration priority subbasins. Management direction emphasizes the participation of tribal communities and businesses in employment, contracting, and other activities associated with restoration work on federal lands. Additional standards reference consideration of subsistence and treaty uses; cooperative work with Tribal Employment Rights Ordinance (TERO) offices; emphasis on cooperative activities and increased use of authorities allowing for tribal, Indian-owned, or minority business preference; and greater opportunities to participate in the economic benefits of commodity offerings.

**Comment:** Map 2-43 is titled "Federally Recognized Tribes"; however, it shows reservation boundaries with the name of the reservation being displayed rather than the tribes that were relegated to a particular reservation. The map title and the map itself should be consistent.

**Response:** This map is now Map 2-34. Its title has been changed to American Indian Reservations.

**Comment:** The Human Uses and Values section of Table 3-5 shows no costs for Alternatives 1 and 2 for tribal consultation, survey, and nomination of cultural sites. This is not correct. During the past 5 to 7 years, the agencies have conducted tribal consultation on a wide variety of issues.

**Response:** It is true that the agencies, and particularly the ICBEMP, have increasingly consulted with tribes on a wide range of issues and interests, and that implementation costs for tribal consultation were not reflected for Alternatives 1 and 2 in the Draft EISs. Such costs have been calculated and are included in the Implementation Cost Analysis Table, Chapter 4, ICBEMP Supplemental Draft EIS.

**Comment:** The EIS should recognize the individuality of the affected tribes and the reality that all tribal interests frequently do not correspond to one another.

**Response:** The recognition that all tribes or tribal interests may not correspond to one another is evi-



denced in this EIS by the fact that the project has committed to consult with the 22 potentially affected tribal governments individually on a government-to-government basis during development and implementation of this EIS. Further, direction specifically discusses the individuality and unique rights and interests of each tribe, and Appendix 8 displays distinct information on each of the 22 tribes.

**Comment:** Instead of putting more lands into preserves or reserves, the land base of tribes should be increased so they can manage the lands.

**Response:** Determining the size of tribal lands is not within the jurisdiction of either the Forest Service or the Bureau of Land Management and is more appropriately addressed at the executive and congressional level.

## Cultural Resources and Religious Freedom

**Comment:** The selected alternative should ensure protection of tribal cultural resources and religious freedom.

**Narrative:** *Some respondents are concerned about protection of what some tribes consider to be cultural resources, including animal species, vision quest sites, burial and food production sites, and other sacred sites. According to some, protection and management of these resources is particularly difficult in some regions because of extensive population growth and checkerboard land ownership. Some feel that the Draft EISs do not adequately preserve Native American values and non-renewable resources and that all cultural resources and sacred sites need permanent protection, not just "buffer zones."*

*These respondents want the EIS to address continued access to federal land to harvest fish from the rivers of the interior basin, or for cultural and religious practices. Respondents focus on treaty rights, protection of cultural and spiritual resources, and concern over maintenance of habitat vital to support traditional gathering and hunting.*

**Response:** In addition to an objective which requires consultation and collaboration on a government-to-government basis, there are standards which require tribal consultation when conducting Subbasin Review, Ecosystem Analysis at the Watershed Scale, and site-specific NEPA analyses on activities that have a potential to affect tribal cultural resources. The agencies are required to initiate agreements with affected tribes on procedures to conform with laws such as Native American Graves Protection and Repatriation Act, the National Historic Preservation Act, and the Archaeological Resource Protection Act. A standard requires the Forest Service and BLM to consult with affected American Indian tribes on land ownership adjustments. An objective requires the agencies to better understand and incorporate into federal land management how places on the landscape are valued by American Indians. Harvestability is addressed with the intent to provide sufficient habitat to support harvestable resources; and to ensure identification, analysis, protection, and/or restoration of resources associated with tribal uses. Direction includes tribal consultation requirements on road and travel management in consideration of tribal rights and interests as well as in monitoring and adaptive management.

## Restoration of Resources Important to Tribal Rights and Interests

**Comment:** The selected alternative should guide land management agencies to restore fish and wildlife habitat and harvestable populations to meet tribal treaty obligations.

**Narrative:** *Several respondents believe that there is not enough attention given to federal agency responsibilities for habitat restoration in support of treaty guaranteed rights. Some feel that the request of Indian tribes to have grazing and logging suspended in riparian areas until those areas can recover from damage is reasonable. They also feel their efforts to restore salmon populations – on which, they point out, that tribes have expended considerable amounts of time, money, and manpower – will have only limited*



*success until there is extensive collaboration with federal agencies. They assert that there is not enough current collaboration for habitat restoration.*

**Response:** Requirements for collaboration and consultation between the federal government and affected American Indian tribes are found throughout the EIS. Management direction is provided to maintain and restore aquatic and terrestrial habitat quality and quantity to support harvestable plants, fisheries, and aquatic and terrestrial species to collaborate with affected federally recognized tribes and solicit tribally identified restoration opportunities. Management direction specifically emphasizes (a) the economic participation of tribes and tribal communities in restoration actions, and (b) coordination and collaboration with tribes, states, other federal entities on restoration, and other planning and decision-making processes. Selection of basin-wide high restoration priority subbasins was directly influenced by an emphasis on tribal communities and resource considerations generally important to many tribes. These subbasins will receive restoration activities, which are intended to benefit the rights and interests of respective tribes.

**Comment:** The EIS should ensure that the Forest Service and BLM meet tribal rights just as they must meet other federal laws.

**Narrative:** *Some respondents feel that current government actions are inconsistent with federal laws when it comes to implementing Endangered Species Act conserva-*

*tion measures on tribal lands. Some people feel that even though many tribes have scaled back some of their treaty-guaranteed resource extractive activities, such as salmon fishing, over the past few years because of resource depletion and habitat destruction, they bear a disproportionate burden for the conservation of listed species. Another person says that because tribes "enjoy dependent sovereignty," they are "subject to the federal Threatened and Endangered Species Act the same as non-Indian persons."*

**Response:** The EIS incorporates the Joint Secretarial Order #3206, *American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act*. Section 1 states in part: "...acknowledges the trust responsibility and treaty obligations of the United States toward Indian tribes and...its government-to-government relationship in dealing with tribes...and that strives to ensure that Indian tribes do not bear a disproportionate burden for the conservation of listed species...."

The EIS requires the BLM and Forest Service to consult with and seek the participation of the affected Indian tribes to the maximum extent practicable whenever their actions may affect tribal trust resources, the exercise of tribal rights, or Indian land. The Joint Secretarial Order #3206 seeks to harmonize Endangered Species Act compliance with the federal government's trust responsibility and treaty obligations to federally recognized American Indian tribes.







# Appendix 5

## Terrestrial Source Habitat Acreage Table

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### Summary

Appendix 5 is a table of data for the terrestrial source habitats used by the 91 terrestrial vertebrates in the 12 Terrestrial Families described in *Source Habitats for Terrestrial Vertebrates of Focus in the Interior Columbia Basin: Broad-scale Trends and Management Implications* (Wisdom et al. in press). Historical and current acreages are presented for each terrestrial source habitat for the basin (not including the Greater Yellowstone Area portion). For each of the terrestrial source habitats within each of the 13 Ecological Reporting Units (ERUs), historical percent of ERU, current percent of ERU, and percent change in geographic extent for the ERU from the historical to the current period are presented. Terrestrial source habitats that were identified by the EIS Team as having declined substantially in geographic extent from the historical to the current period are marked in the table.

Appendix 5 (approximately 10 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.

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# Appendix 6

## Terrestrial and Aquatic Species

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# Introduction

This appendix provides several lists of species referred to in this EIS. These lists include: threatened, endangered, proposed, and candidate species; sensitive vertebrates and plants; vascular plants used to evaluate the alternatives; terrestrial vertebrates used to evaluate the alternatives; broadly distributed plants; vertebrates not analyzed; vascular plants with a Natural Heritage rank of G1-G3 and non-vascular plants with a rank of S1-S3; and vertebrates affected by roads. Unless otherwise noted, the lists in this appendix were updated in July 1999 to make changes that have occurred since the Draft EISs were published.

Table 1 lists the federally listed threatened, endangered, proposed, and candidate species within the project area.

Table 2 lists the sensitive vertebrate and plant species designated by the BLM and Forest Service within the project area.

Table 3 lists the terrestrial vertebrate species used in the evaluation of alternatives.

Table 4 is a list of the plants in the project area used in the evaluation of alternatives and their Natural Heritage Ranking of G1 - G3 and/or T1 - T3.

Table 5 lists the vertebrates that were not used in the evaluation of the alternatives because they are more appropriate to evaluate at a finer scale than the ICBEMP EIS, or no analysis done, and not recommended for fine-scale analysis.

Table 6 lists the broad-scale species of focus and the effects of road-related factors on them and their habitats. The factors and effects listed here were documented from empirical literature and literature summaries, with each number listed below denoting a footnoted study (Wisdom et al. 'in press). Presumed effects are denoted by a letter corresponding to a footnote that describes each presumed effect and cites the supporting literature related to other species. Blank cells indicate no research results were found on the factor in relation to the species, and should not be interpreted to indicate no effects occur from the factor.

Table 7 is a list of plant species of concern that are considered to be broadly distributed because they occur in two or more administrative units. These plants are referenced in Objective B-O46.

Table 8 is a list of vascular plants that are ranked by the Natural Heritage Projects as G1-G3 and non-vascular plants ranked as S1- S3 (see Standard B-S47). Table 4 in this appendix explains the ranking system.



**Table 1. Threatened, Endangered, Proposed, or Candidate Species.**

	Approved Recovery Plan	Designated Critical Habitat
<b>Threatened (16 spp.)</b>		
Bald eagle	Yes	No
Warner sucker	No	Yes
Hutton Spring tui chub	No	No
Lahontan cutthroat trout	Yes	No
Foskett speckled dace	No	No
Snake River chinook salmon (spring/summer)	No	Yes
Snake River chinook salmon (fall)	No	Yes
Grizzly bear	Yes	No
Water howellia	No	No
MacFarlane's four o'clock	Yes	Yes
Bliss Rapids snail	Yes	No
Ute's lady tresses	No	No
Howell's spectacular thelypody	No	No
Bull trout (Columbia River)	No	No
Snake River steelhead	No	No
Mid-Columbia steelhead	No	No
<b>Endangered (19 spp.)</b>		
Shortnose sucker	No	No
Lost River sucker	No	No
Borax Lake chub	Yes	Yes
Snake River sockeye salmon	No	No
Woodland caribou	Yes	No
Gray wolf	Yes	No
Applegate's milk-vetch	No	No
Malheur wire-lettuce	No	No
Kootenai River white sturgeon	No	No
Idaho springsnail	Yes	No
Utah valvata snail	Yes	No
Snake River physa snail	Yes	No
Banbury springs lanx	Yes	No
Bruneau hot springsnail	No	No
Whooping crane	Yes	Yes
Bull trout (Klamath River)	No	No
Upper Columbia steelhead	No	No
Upper Columbia chinook salmon	No	No
Wenatchee Mountains (Oregon) Checkermallow	No	No
<b>Proposed (3 spp.)</b>		
Spalding's catchfly (PE)	No	No
Canada lynx (PT)	No	No
Northern Idaho ground squirrel (PT)	No	No
<b>Candidate (10 spp.)</b>		
Oregon spotted frog	No	No
Columbia spotted frog	No	No
Basalt daisy	No	No
Christ's paintbrush	No	No
Northern Wormwood	No	No
Umtanum desert-buckwheat	No	No
Showy stickseed	No	No
Slick spot peppergrass	No	No
White Bluffs bladderpod	No	No
Washington Ground Squirrel	No	No

note: this table is current as of November 1999



Table 2. Sensitive Vertebrate and Plant Species

Common Name	Scientific Name	BLM			Forest Service Region		
		OR/WA	MT	ID	R 1	R 4	R 6
Mammals							
spotted bat	Euderma maculatum			X		X	
Townsend's (Pacific, western) big-eared bat	Corynorhinus (Plecotus) townsendii townsendii	X	X	X	X	X	X
western small-footed myotis	Myotis ciliolabrum		X	X			
long-eared myotis	Myotis evotis		X	X			
fringed myotis	Myotis thysanodes			X			
long-legged myotis	Myotis volans		X	X			
Yuma myotis	Myotis yumaensis		X	X			
dark kangaroo mouse	Microdipodops megacephalus			X			
Preble's shrew	Sorex preblei						X
rock squirrel	Spermophilus variegatus			X			
northern bog lemming	Synaptomys borealis		X		X		
pygmy rabbit	Brachylagus idahoensis	X		X	X		X
wolverine	Gulo gulo	X	X	X	X	X	
California wolverine	Gulo gulo luteus						X
fisher	Martes pennanti	X	X	X	X	X	
kit fox	Vulpes velox macrotis	X		X			
California bighorn sheep	Ovis canadensis californiana			X			X
western gray squirrel	Sciurus griseus	X					
Washington ground squirrel	Spermophilus washingtoni	X					
Birds							
common loon	Gavia immer		X		X	X	X
red-necked grebe	Podiceps grisegena	X					
trumpeter swan	Cygnus buccinator			X	X	X	
black tern	Chlidonias niger		X				
harlequin duck	Histrionicus histrionicus		X	X	X	X	
yellow rail	Coturnicops noveboracensis	X					
greater sandhill crane	Grus canadensis tabida	X					X
long-billed curlew	Numenius americanus		X	X			X
upland sandpiper	Bartramia longicauda	X		X			X
snowy plover	Charadrius alexandrinus	X					
flamulated owl	Otus flammeolus	X	X	X	X	X	
great gray owl	Strix nebulosa					X	
boreal owl	Aegolius funereus		X	X		X	
burrowing/western burrowing owl	Speotyto (Athene) cunicularia hypugea	X		X	X		
northern goshawk	Accipiter gentilis	X	X	X	X	X	
prairie falcon	Falco mexicanus			X			
ferruginous hawk	Buteo regalia	X		X		X	
Swainson's hawk	Buteo swainsoni		X				
northern harrier	Circus cyaneus			X			
white-headed woodpecker	Picoides albolarvatus	X		X	X	X	
three-toed woodpecker	Picoides tridactylus	X	X	X		X	
black-backed woodpecker	Picoides arcticus	X	X	X	X		
hairy woodpecker	Picoides villosus		X				
Lewis' woodpecker	Melanerpes lewis	X		X			
pileated woodpecker	Dryocopus pileatus		X				
red-naped woodpecker	Sphyrapicus nuchalis			X			
Williamson's sapsucker	Sphyrapicus throideus			X			
mountain quail	Oerortyx pictus			X	X	X	
Columbian sharp-tailed grouse	Tympanuchus phasianellus columbianus	X	X	X	X	X	
western sage grouse	Centrocercus urophasianus	X		X	X		X
tricolored blackbird	Agelaius tricolor						X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Common Name	Scientific Name	BLM			Forest Service Region		
		OR/WA	MT	ID	R 1	R 4	R 6
(Birds continued)							
yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>			x			
black rosy finch	<i>Leucosticte arctoa atrata</i>						x
yellow-billed cuckoo	<i>Coccyzus americanus</i>	x		x			
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>			x			
pygmy nuthatch	<i>Sitta pygmaea</i>	x		x			
loggerhead shrike	<i>Lanus ludovicianus</i>			x			
Vaux's swift	<i>Chaetura vauxi</i>			x			
black swift	<i>Cypseloides niger</i>			x			
olive-sided flycatcher	<i>Contopus borealis</i>			x			
dusky flycatcher	<i>Empidonax oberholseri</i>			x			
northern pygmy owl	<i>Glaucidium gnoms</i>	x					
arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	x					
American white pelican	<i>Pelecanus erythrorhynchos</i>	x					
Cordilleran flycatcher	<i>Empidonax occidentalis</i>			x			
Hammond's flycatcher	<i>Empidonax hammondii</i>			x			
gray flycatcher	<i>Empidonax wrightii</i>			x			
willow flycatcher	<i>Empidonax traillii</i>			x			
black-throated gray wrbler	<i>Dendroica nigrescens</i>			x			
Townsend's warbler	<i>Dendroica townsendii</i>			x			
yellow warbler	<i>Dendroica petechia</i>			x			
MacGillivray's warbler	<i>Oporonis tolmiei</i>			x			
Virginia's warbler	<i>Vermivora virginiae</i>			x			
Wilson's warbler	<i>Wilsonia pusilla</i>			x			
purple martin	<i>Progne subis</i>	x					
solitary vireo	<i>Vireo solitarius</i>			x			
bobolink	<i>Dolichonyx oryzivorus</i>			x			
Scott's oriole	<i>Icterus pusilla</i>			x			
veery	<i>Catharus fuscescens</i>			x			
Swainson's thrush	<i>Catharus ustulatus</i>			x			
Calliope hummingbird	<i>Stellula caliope</i>			x			
rufous hummingbird	<i>Selaphorus rufus</i>			x			
grasshopper sparrow	<i>Ammodramus savannarum</i>			x			
Brewer's sparrow	<i>Spizella breweri</i>			x			
sage sparrow	<i>Amphispiza belli</i>	x		x			
green-tailed towhee	<i>ipilo chlorurus</i>			x			
Reptiles and Amphibians							
northern red-legged frog	<i>Rana auroa auroa</i>			x			x
northern leopard frog	<i>Rana pipiens</i>	x			x		
tailed frog	<i>Ascaphus truei</i>		x				
wood frog	<i>Rana sylvatica</i>		x				
western toad	<i>Bufo boreas</i>			x	x		
Coeur d'Alene salamander	<i>Plethodon vandykei idahoensis</i>		x	x	x	x	
Cope's giant salamander	<i>Dicamptodon copei</i>						x
Larch Mountain salamander	<i>Plethodon larseii</i>	x					x
painted turtle	<i>Chrysemys picta</i>	x					x
western pond turtle	<i>Clemmys marmorata</i>	x					
	<i>Clemmys marmorata marmorata</i>						
Mojave black-collared lizard	<i>Crotahytus bicinctores</i>			x			
western ground snake	<i>Sonora seminannulata</i>			x			
ringneck snake	<i>Diadophis punctatus</i>			x			
longnose snake	<i>Rhinocheilus lecontei</i>			x			



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Common Name	Scientific Name	BLM			Forest Service Region		
		OR/WA	MT	ID	R 1	R 4	R 6
Fish							
Malheur mottled sculpin	<i>Cottus bairdii</i> spp.	x					x
Shoshone sculpin	<i>Cottus greenei</i>			x			
Wood River sculpin	<i>Cottus leiopomus</i>			x		x	
torrent sculpin	<i>Cottus rhotheus</i>				x		
shorthead sculpin	<i>Cottus coniusus</i>			x			
pit sculpin	<i>Cottus pitensis</i>						x
slender sculpin	<i>Cottus tenuis</i>						x
marginated sculpin	<i>Cottus marginatus</i>	x					
westslope cutthroat trout	<i>Oncorhynchus clarki lewisi</i>	x	x	x	x	x	
Yellowstone cutthroat trout	<i>Oncorhynchus clarki bouvieri</i>			x			
fine spotted cutthroat trout	<i>Oncorhynchus clarki</i> spp.					x	
interior redband trout	<i>Oncorhynchus mykiss</i> spp.			x	x		x
Great Basin redband trout	<i>Oncorhynchus mykiss</i> spp.	x					
spring/summer chinook salmon	<i>Oncorhynchus tshawyscha</i>			x	x		x
coho salmon	<i>Oncorhynchus kisutch</i> spp.						x
Oregon tui chub	<i>Gila bicolor oregonensis</i>						x
Sheldon tui chub	<i>Gila bicolor eurysuma</i>	x					
summer basin tui chub	<i>Gila bicolor</i> spp.	x					
leatherside chub	<i>Gila copei</i>			x			
white sturgeon	<i>Acipenser transmontanus</i>			x			
Goose Lake sucker	<i>Catostomus occidentalis</i>	x					x
	<i>lacusanerinus</i>						
Klamath large-scale sucker	<i>Catostomus synderi</i>						x
Miller Lake lamprey	<i>Lampetra minima</i>	x					
Pacific lamprey	<i>Lampetra tridentata</i>			x			
Goose Lake lamprey	<i>Lampetra tridentata</i> spp.	x					
ling (burbot)	<i>Lota lota</i>			x	x		
pygmy whitefish	<i>Prosopium coultrisi</i>	x					
Vascular Plants/ Bryophytes/Lichens/Fungi (scientific names only)							
	<i>Abronia umbellata</i> spp. breviflora						x
	<i>Achnatherum herndersonii</i>	x					x
	<i>Achnatherum wallowensis</i>	x					x
	<i>Adoxa moschatellina</i>				x		
	<i>Agastache cusickii</i>				x		
	<i>Ageratina occidentalis</i> *				x		
	<i>Agoseris elata</i>						x
	<i>Agoseris lackschewitzii</i>			x		x	
	<i>Agrostis hendersonii</i>	x					
	<i>Agrostis howellii</i>	x					x
	<i>Agrostis mertensi</i> *						x
	<i>Allium aaseae</i>			x			
	<i>Allium acuminatum</i>				x		
	<i>Allium anceps</i>			x			
	<i>Allium campanulatum</i>						x
	<i>Allium dictuon</i>	x					x
	<i>Allium geyeri</i> var. geyeri	x					x
	<i>Allium madidum</i>					x	
	<i>Allium parvum</i>				x		
	<i>Allium peninsulare</i>						x
	<i>Allium tolmiei</i> var. persimile			x		x	
	<i>Allium validum</i>			x			
	<i>Allotropa virgata</i>			x	x	x	
	<i>Amerorchis rotundifolia</i>				x		



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	ORWA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Ancistracarpus filagineus</i>			X			
<i>Andromeda polifolia</i>				X		
<i>Androsace elongata</i> spp. <i>acuta</i>						X
<i>Anemone oregana</i> var. <i>felix</i>						X
<i>Antennaria arcuata</i>			X			
<i>Antennaria corymbosa</i>						X
<i>Antennaria densifolia</i>				X		
<i>Antennaria parvifolia</i>						X
<i>Aquilegia brevistyla</i>				X		
<i>Arabis fecunda</i>				X		
<i>Arabis hastatula</i>	X					X
<i>Arabis koehleri</i> var. <i>koehleri</i>	X					
<i>Arabis modesta</i>						X
<i>Arabis sparsiflora</i> var. <i>atrorubens</i>						X
<i>Arabis suffrutescens</i> var. <i>horizontalis</i>	X					X
<i>Arctostaphylos hispidula</i>						X
<i>Arenaria franklinii</i> var. <i>thompsonii</i>	X					
<i>Arnica viscosa</i>						X
<i>Artemisia campestris</i> spp.	X					X
<i>borealis</i> var. <i>wormskioldii</i>						
<i>Artemisia ludoviciana</i> spp. <i>estesii</i>	X					X
<i>Asarum caudatum</i> var. <i>viridiflorum</i> *	X					
<i>Aspicilia fruticosa</i>			X			
<i>Asplenium septentrionale</i>						X
<i>Asplenium trichomanes</i>				X		
<i>Asplenium trichomanes-ramosum</i> *			X			
<i>Aster borealis</i>	X			X		
<i>Aster jessicae</i>	X		X			
<i>Aster meritus</i> *						X
<i>Astragalus amblytropis</i>			X			
<i>Astragalus amnis-amissi</i>					X	
<i>Astragalus anserinus</i>			X		X	
<i>Astragalus aquilonius</i>			X		X	
<i>Astragalus arrectus</i>						X
<i>Astragalus arthurii</i>						X
<i>Astragalus atratus</i> var. <i>inseptus</i>			X			
<i>Astragalus australis</i> var. <i>olympicus</i>						X
<i>Astragalus barrii</i>				X		
<i>Astragalus columbianus</i>	X					
<i>Astragalus cottonii</i> *	X					
<i>Astragalus cusickii</i> var. <i>cusickii</i>						X
<i>Astragalus cusickii</i> var. <i>sterilis</i> *			X			
<i>Astragalus diaphanus</i> var. <i>diurnus</i>						X
<i>Astragalus diversifolius</i> var. <i>diversifolius</i>			X		X	
<i>Astragalus gilviflorus</i>			X			
<i>Astragalus jejunos</i> var. <i>jejunus</i>			X		X	
<i>Astragalus kentrophyta</i> var. <i>douglasii</i>	X					
<i>Astragalus lackschewitzii</i>				X		
<i>Astragalus leptaleus</i>			X			
<i>Astragalus microcystis</i>				X		X
<i>Astragalus mulfordiae</i>			X			
<i>Astragalus newberryi</i> var. <i>castoreus</i>			X			
<i>Astragalus oniciformis</i>			X			
<i>Astragalus paysonii</i>			X	X	X	
<i>Astragalus peckii</i>						X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Astragalus pulsiferae</i> var. <i>suksdorfii</i>	X					
<i>Astragalus purshii</i> var. <i>ophiogenes</i>			X			
<i>Astragalus salmonis</i>			X			
<i>Astragalus scaphoides</i>				X		
<i>Astragalus sinuatus</i>	X					
<i>Astragalus tegetarioides</i>	X					X
<i>Astragalus tetraapterus</i>			X			
<i>Astragalus tyghensis</i>						X
<i>Astragalus vexilliflexus</i> var. <i>nubilus</i>					X	
<i>Astragalus yoder-williamsii</i>			X			
<i>Athysanus pusillus</i>				X		
<i>Balsamorhiza macrophylla</i>				X		
<i>Bensoniella oregana</i>	X					X
<i>Betula pumila</i> var. <i>glandulifera</i>				X		
<i>Bidens beckii</i>				X		
<i>Blechnum spicant</i>			X	X		
<i>Bolandra oregana</i>	X					X
<i>Botrychium ascendens</i>	X		X	X		X
<i>Botrychium campestre</i>						X
<i>Botrychium crenulatum</i>	X		X	X		X
<i>Botrychium fenestratum</i>						X
<i>Botrychium hesperium</i>				X		X
<i>Botrychium lanceolatum</i> var. <i>lanceolatum</i>			X	X		X
<i>Botrychium lineare</i>	X					X
<i>Botrychium lunaria</i>						X
<i>Botrychium minganense</i>			X	X		X
<i>Botrychium montanum</i>				X		X
<i>Botrychium paradoxum</i>	X			X		X
<i>Botrychium pedunculosum</i>	X			X		X
<i>Botrychium pinnatum</i>			X	X		X
<i>Botrychium pumicola</i>						X
<i>Botrychium simplex</i>			X	X		X
<i>Bouteloua gracilis</i>			X			
<i>Brasenia schreberi</i>				X		
<i>Bryoria subdivergens</i>				X		
<i>Bryum calobryoides</i>			X		X	
<i>Buxbaumia aphylla</i>			X	X		
<i>Buxbaumia piperi</i>			X			
<i>Buxbaumia viridis</i>				X		
<i>Calamagrostis breweri</i>						X
<i>Calamagrostis tweedyi</i>			X		X	
<i>Callitriche fassettii</i>	X					
<i>Calochortus greenei</i>	X					
<i>Calochortus howellii</i>						X
<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i>						X
<i>Calochortus longebarbatus</i> var. <i>peckii</i>	X					X
<i>Calochortus macrocarpus</i> var. <i>maculosus</i>	X		X			X
<i>Calochortus monophyllus</i>						X
<i>Calochortus nitidus</i>	X		X	X		X
<i>Calochortus nudus</i>						X
<i>Calochortus umpquaensis</i>						X
<i>Camassia cusickii</i>			X		X	
<i>Camassia howellii</i>	X					X
<i>Camissonia graciliflora</i>						X
<i>Camissonia andina</i>		X				



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Camissonia palmeri</i>			X			
<i>Camissonia pterosperma</i>			X			
<i>Camissonia pygmaea</i>	X					X
<i>Campanula lasiocarpa</i>						X
<i>Cardamine constancei</i>			X	X		
<i>Cardamine nuttallii</i> var. <i>gemma</i>	X					
<i>Cardamine pattersonii</i>	X					X
<i>Carex amplifolia</i>				X		
<i>Carex anthoxanthea</i>						X
<i>Carex atosquama</i>						X
<i>Carex backii</i>						X
<i>Carex buxbaumii</i>			X	X		
<i>Carex capillaris</i>						X
<i>Carex chordorrhiza</i>			X	X		X
<i>Carex circinata</i>						X
<i>Carex comosa</i>			X	X		X
<i>Carex crawfordii</i>						X
<i>Carex densa</i>						X
<i>Carex duriuscula</i>						X
<i>Carex flava</i>			X	X		X
<i>Carex foenea</i>						X
<i>Carex gigas</i>						X
<i>Carex gynocrates</i>						X
<i>Carex hendersonii</i>			X	X		
<i>Carex heteroneura</i> var. <i>epapillosa</i>						X
<i>Carex hystericina</i>						X
<i>Carex idaho</i> *			X	X	X	
<i>Carex incurviformis</i> var. <i>incurviformis</i>					X	
<i>Carex interior</i>						X
<i>Carex leptalea</i>					X	
<i>Carex livida</i>			X	X		X
<i>Carex macrochaeta</i>						X
<i>Carex magellanica</i> spp. <i>magellanica</i>				X		
<i>Carex nardina</i>						X
<i>Carex nervina</i>						X
<i>Carex nova</i>						X
<i>Carex novegica</i>						X
<i>Carex obtusata</i>						X
<i>Carex parryana</i>						X
<i>Carex pauciflora</i>						X
<i>Carex pluriflora</i>						X
<i>Carex prairea</i>				X		
<i>Carex proposita</i>						X
<i>Carex rostrata</i>				X		X
<i>Carex saxatilis</i> var. <i>major</i>						X
<i>Carex scirpoidea</i>						X
<i>Carex serratodens</i> *						X
<i>Carex straminiformis</i>			X			
<i>Carex stylosa</i>						X
<i>Carex sychnocephala</i>						X
<i>Carex tenuifolia</i>						X
<i>Carex vaginata</i>				X		
<i>Carex vallicola</i>						X
<i>Carex xerantica</i>				X		X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Cassiope lycopodioides</i>						X
<i>Castilleja chambersii</i>	X					
<i>Castilleja chlorotica</i>						X
<i>Castilleja chlorotica</i>	X					X
<i>Castilleja christii</i>					X	
<i>Castilleja covilleana</i>				X		
<i>Castilleja cryptantha</i>	X					X
<i>Castilleja fraterna</i>	X					X
<i>Castilleja miniata</i> spp. <i>miniata</i> *				X		
<i>Castilleja pilosa</i> var. <i>steenensis</i>	X					
<i>Castilleja rubida</i>	X					X
<i>Castilleja schizotricha</i>						X
<i>Castilleja thompsonii</i>						X
<i>Caulanthus major</i> var. <i>nevadensis</i>	X					
<i>Ceanothus prostratus</i>			X			
<i>Cetraria subalpina</i>				X		
<i>Chaenactis cusickii</i>	X		X			
<i>Chaenactis stevioides</i>			X			
<i>Chaenactis thompsonii</i>						X
<i>Cheilanthes intertexta</i>						X
<i>Chiloscyphus gemmiparus</i>	X					
<i>Chlorogalum angustifolium</i>						X
<i>Chrysolepis chrysophylla</i>						X
<i>Chrysosplenium tetrandrum</i>						X
<i>Cicuta bulbifera</i>			X	X		X
<i>Cimicifuga elata</i>	X					X
<i>Cirsium longistylum</i>				X		
<i>Cladonia andreggii</i>			X	X		
<i>Cladonia luteoalba</i>			X			
<i>Cladonia transcendens</i>			X			
<i>Cladonia uncialis</i>			X			
<i>Clarkia heterandra</i>						X
<i>Clarkia rhomboidea</i>				X		
<i>Claytonia arenicola</i>				X		
<i>Claytonia lanceolata</i> var. <i>pacifica</i>						X
<i>Cleomella plocasperma</i>			X			
<i>Clintonia andrewsiana</i>						X
<i>Collema curtisporum</i>			X	X		
<i>Collema furfuraceum</i>			X			
<i>Collinsia sparsiflora</i> var. <i>bruceae</i>						X
<i>Collomia debilis</i> var. <i>camporum</i>					X	
<i>Collomia mazama</i>	X					X
<i>Collomia renacta</i>	X					
<i>Coptis aspleniifolia</i>						X
<i>Coptis trifolia</i>						X
<i>Cordylanthus maritimus</i> spp. <i>palustris</i>						X
<i>Cornus nuttallii</i>			X	X		
<i>Corydalis aquae-gelidae</i>	X					X
<i>Corydalis caseana</i> spp. <i>hastata</i>			X		X	
<i>Corydalis sempervirens</i>				X		
<i>Crepis bakeri</i> spp. <i>idahoensis</i>			X			
<i>Cryptantha caespitosa</i>			X			
<i>Cryptantha milobakeri</i>						X
<i>Cryptantha rosetellata</i>						X
<i>Cryptogramma stelleri</i>						X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Cupressus bakeri</i>						X
<i>Cuscuta denticulata</i>			X			
<i>Cusickiella douglasii</i>	X					
<i>Cymopterus acaulis</i> var. <i>greeleyorum</i>			X			
<i>Cymopterus davisii</i>					X	
<i>Cymopterus douglasii</i>					X	
<i>Cymopterus ibapensis</i>			X			
<i>Cyperus bipartitus</i>						X
<i>Cypripedium fasciculatum</i>	X		X	X		X
<i>Cypripedium parviflorum</i> *	X		X	X		X
<i>Cypripedium passerinum</i>				X		
<i>Dasynotus daubenmirei</i>				X		
<i>Delphinium nudicaule</i>						X
<i>Delphinium nuttallii</i> spp. <i>nuttallii</i> *	X					
<i>Delphinium nuttallii</i> spp. <i>ochroleucum</i> *	X					
<i>Delphinium viridescens</i>	X					X
<i>Dermatocarpon lorenzianum</i>			X			
<i>Dicentra pauciflora</i>						X
<i>Dimeresia howellii</i>			X			
<i>Dodecatheon austrofrigidum</i>	X					X
<i>Douglasia idahoensis</i>				X	X	
<i>Downingia bacigalupii</i>			X			
<i>Draba aurea</i>						X
<i>Draba breweri</i> var. <i>cana</i> *						X
<i>Draba globosa</i> *					X	
<i>Draba howellii</i>	X					X
<i>Draba incerta</i>			X			
<i>Draba longipes</i>						X
<i>Draba trichocarpa</i>					X	
<i>Drosera anglica</i>				X		
<i>Drosera intermedia</i>				X		
<i>Drosera linearis</i>				X		
<i>Dryas drummondii</i>						X
<i>Dryopteris cristata</i>				X		X
<i>Eatonella nivea</i>	X		X			
<i>Eleocharis atropurpurea</i>						X
<i>Eleocharis rostellata</i>				X		
<i>Enemion stipitatum</i> *						X
<i>Epilobium oreganum</i>	X					X
<i>Epilobium palustre</i>				X		
<i>Epilobium siskiyouense</i>	X					X
<i>Epipactis gigantea</i>			X	X		
<i>Ericameria arborescens</i>						X
<i>Ericameria discoidea</i> *				X		
<i>Ericameria nauseosus</i> spp. <i>nauseosus</i> var. <i>nana</i> *			X			
<i>Ericameria parryi</i> spp. <i>montana</i> *			X	X	X	
<i>Erigeron asperugineus</i>					X	
<i>Erigeron cervinus</i>						X
<i>Erigeron disparipilus</i>						X
<i>Erigeron elata</i> *						X
<i>Erigeron engelmannii</i> var. <i>davisii</i>						X
<i>Erigeron evermannii</i>				X		
<i>Erigeron howellii</i>	X					X
<i>Erigeron ochroleucus</i> var. <i>ochroleucus</i>				X		
<i>Erigeron oreganus</i>	X					X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Erigeron peregrinus</i> spp. <i>peregrinus</i> var. <i>thompsonii</i>						X
<i>Erigeron petrophilus</i>						X
<i>Erigeron salishii</i>						X
<i>Eriogonum capistratum</i> var. <i>welshii</i>		X		X		
<i>Eriogonum codium</i>	X					
<i>Eriogonum cusickii</i>	X					
<i>Eriogonum desertorum</i>			X			
<i>Eriogonum lobbii</i>						X
<i>Eriogonum meledonum</i>					X	
<i>Eriogonum ochrocephalum</i> var. <i>calcareum</i>			X			
<i>Eriogonum prociduum</i>	X					X
<i>Eriogonum salicornioides</i>	X					
<i>Eriogonum shockleyi</i> var. <i>packardiae</i>			X			
<i>Eriogonum shockleyi</i> var. <i>shockleyi</i>			X			
<i>Eriogonum umbellatum</i> var. <i>glaberrimum</i>	X					
<i>Eriophorum alpinum</i> *				X		
<i>Eriophorum chamissonis</i>						X
<i>Eriophorum gracile</i>				X		
<i>Eriophorum viridicarinatum</i>				X		X
<i>Eritrichium nanum</i> var. <i>elongatum</i>						X
<i>Eryngium petiolatum</i>	X					X
<i>Erythronium elegans</i>						X
<i>Erythronium howellii</i>	X					X
<i>Eschscholzia caespitosa</i>						X
<i>Escobaria vivipara</i> *			X			
<i>Eucephalus gormanii</i> *	X					X
<i>Eucephalus vialis</i> *						X
<i>Euonymus occidentalis</i>						X
<i>Festuca elmeri</i>						X
<i>Filipendula occidentalis</i>	X					X
<i>Frasera fastigiata</i> *	X					X
<i>Fritillaria camschatcensis</i>						X
<i>Fritillaria glauca</i>						X
<i>Fritillaria purdyi</i>						X
<i>Galium kamtschaticum</i>						X
<i>Galium serpenticum</i> var. <i>warnerense</i>	X					X
<i>Gaultheria hispidula</i>				X		X
<i>Gentiana douglasiana</i>						X
<i>Gentiana glauca</i>						X
<i>Gentiana newberryi</i> var. <i>newberryi</i>						X
<i>Gentiana plurisetosa</i>						X
<i>Gentiana setigera</i>	X					X
<i>Gentianella tenella</i>						X
<i>Gentianopsis simplex</i>				X		
<i>Geum rivale</i>						X
<i>Geum rossii</i> var. <i>depressum</i>						X
<i>Geum triflorum</i> var. <i>campanulatum</i>						X
<i>Gilia millefoliata</i>	X					
<i>Glossopetalon spinescens</i> *				X		
<i>Glyptopleura marginata</i>			X			
<i>Goodyera repens</i>				X		
<i>Grimmie brittoniae</i>			X	X		
<i>Grindelia howellii</i>			X	X		
<i>Hackelia cronquistii</i>			X			



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	ORWA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Hackelia diffusa</i> var. <i>diffusa</i>	x					
<i>Hackelia hispida</i> var. <i>disjuncta</i>						x
<i>Hackelia ophiobia</i>			x			
<i>Hackelia taylorii</i>						x
<i>Hackelia venusta</i>	x					x
<i>Halimolobos perplexa</i> var. <i>lemhiensis</i>				x		
<i>Halimolobos perplexa</i> var. <i>perplexa</i>			x	x	x	
<i>Hastingsia atropurpurea</i>	x					x
<i>Hastingsia bracteosa</i>						x
<i>Hazardia whitneyi</i> var. <i>discoidea</i>						x
<i>Helodium blandowii</i>			x			
<i>Heteranthera dubia</i>				x		
<i>Heterocodon rariflorum</i>				x		
<i>Heuchera grossulariifolia</i> var. <i>tenuifolia</i>						x
<i>Hookeria lucens</i>				x		
<i>Horkelia congesta</i> spp. <i>congesta</i>	x					
<i>Horkelia hendersonii</i>	x					x
<i>Horkelia tridentata</i> spp. <i>tridentata</i>						x
<i>Hydrocotyle verticillata</i>						x
<i>Hypericum majus</i>				x		x
<i>Hypogymnia apinnata</i>			x			
<i>Idahoia scapigera</i>				x		
<i>Iliamna bakeri</i>	x					x
<i>Iliamna latibracteata</i>						x
<i>Iliamna longisepala</i>						x
<i>Ipomopsis polycladon</i>			x			
<i>Iris versicolor</i>				x		
<i>Ivesia phypara</i> var. <i>shellyi</i>	x					
<i>Ivesia shockleyi</i>						x
<i>Juncus hallii</i>			x	x		
<i>Juncus kelloggii</i>	x		.			
<i>Kalmia microphylla</i> *				x		
<i>Kalmiopsis leachiana</i> * (Douglas Co. population)	x					x
<i>Keckiella lemmonii</i>						x
<i>Kobresia myosuroides</i>						x
<i>Kobresia simpliciuscula</i>						x
<i>Kumlienia cooleyae</i> *						x
<i>Lasthenia macrantha</i> spp. <i>prisca</i>	x					
<i>Lathyrus bijugatus</i>				x		
<i>Lathyrus holochlorus</i>	x					
<i>Lathyrus torreyi</i>	x					
<i>Lepidium davisii</i>	x		x			
<i>Lepidium papilliferum</i>			x		x	
<i>Leptodactylon pungens</i> spp. <i>hazeliae</i>	x		x		x	x
<i>Lesquerella carinata</i> var. <i>languida</i>		x		x		
<i>Lesquerella humilis</i>					x	
<i>Lesquerella paysonii</i>				x	x	
<i>Lesquerella pulchella</i>				x		
<i>Lesquerella tuplashensis</i>	x					
<i>Lewisia columbiana</i> var. <i>columbiana</i>						x
<i>Lewisia cotyledon</i> var. <i>cotyledon</i> *	x					x
<i>Lewisia leeana</i>						x
<i>Lilium kelloggii</i>						x
<i>Limnanthes floccosa</i> spp. <i>bellingariana</i>	x					x
<i>Limnanthes gracilis</i> var. <i>gracilis</i>	x					x



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Limonium californicum</i>						X
<i>Limosella acaulis</i>			X			
<i>Limonium californicum</i>						X
<i>Linanthus bolanderi</i>						X
<i>Liparis loeselii</i>	X			X		X
<i>Listera borealis</i>						X
<i>Lobaria hallii</i>			X			
<i>Lobaria linita</i>			X			
<i>Lobaria scrobiculata</i>			X			
<i>Lobelia dortmanna</i>	X					X
<i>Lobelia kalmii</i>	X					X
<i>Loeflingia squarrosa</i> var. <i>squarrosa</i>	X					
<i>Loiseleuria procumbens</i>						X
<i>Lomatium cookii</i>						X
<i>Lomatium cusickii</i>						X
<i>Lomatium engelmannii</i>						X
<i>Lomatium erythrocarpum</i>						X
<i>Lomatium geyeri</i>				X		
<i>Lomatium greenmanii</i>						X
<i>Lomatium laevigatum</i>						X
<i>Lomatium ochocense</i>	X					X
<i>Lomatium ravenii</i>						X
<i>Lomatium rollinsii</i>	X					
<i>Lomatium salmoniflorum</i>			X	X		X
<i>Lomatium suksdorfii</i>	X					X
<i>Lomatium tracyi</i>						X
<i>Lomatium tuberosum</i>	X					
<i>Lomatium watsonii</i>						X
<i>Lomatogonium rotatum</i>			X	X		
<i>Lotus stipularis</i>						X
<i>Luina serpentina</i>						X
<i>Lupinus aridus</i> spp. <i>ashlandensis</i>	X					X
<i>Lupinus sabinianus</i>	X					
<i>Lupinus sabinii</i>						X
<i>Lupinus tracyi</i>						X
<i>Lupinus uncialis</i>			X			
<i>Luzula arcuata</i>						X
<i>Lycopodiella inundata</i>				X		X
<i>Lycopodium complanatum</i>						X
<i>Lycopodium dendroideum</i>				X		X
<i>Lycopodium sitchense</i> *				X		
<i>Machaerocarpus californicus</i>			X			X
<i>Meconella oregana</i>	X					X
<i>Meesia longiseta</i>			X			
<i>Meesia triquetra</i>				X		
<i>Mentzelia mollis</i>			X			
<i>Mertensia bella</i>				X		
<i>Microseris borealis</i>						X
<i>Microseris douglasii</i> spp. <i>douglasii</i>						X
<i>Microseris howellii</i>						X
<i>Microseris laciniata</i> spp. <i>detlingii</i>	X					X
<i>Mimulus alsinoides</i>				X		
<i>Mimulus bolanderi</i>						X
<i>Mimulus clivicola</i>			X			X
<i>Mimulus evanescens</i>	X					X



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Mimulus hymenophyllus</i>	x		x			x
<i>Mimulus jungermannioides</i>	x					x
<i>Mimulus primuloides</i>				x		
<i>Mimulus pulsiferae</i>						x
<i>Mimulus suksdorfii</i>						x
<i>Mimulus tricolor</i>						x
<i>Mimulus washingtonensis*</i>			x	x		
<i>Monardella purpurea</i>						x
<i>Montia diffusa</i>						x
<i>Montia howellii</i>	x					x
<i>Muhlenbergia glomerata</i>						x
<i>Muhlenbergia racemosa</i>				x		
<i>Myosurus sessilis</i>	x					
<i>Nasella viridula*</i>			x			
<i>Navarretia tagetina</i>	x					x
<i>Nemacladus capillaris</i>						x
<i>Nemacladus rigidus</i>			x			
<i>Nicotiana attenuata</i>						x
<i>Oenothera psammophila</i>			x			
<i>Ophioglossum pusillum</i>	x			x		x
<i>Orogenia fusiformis</i>				x		
<i>Orthocarpus bracteosus</i>	x					
<i>Oxytropis borealis</i> var. <i>viscida</i>						x
<i>Oxytropis campestris</i> var. <i>columbiana</i>	x			x		
<i>Oxytropis campestris</i> var. <i>wanapum</i>	x					
<i>Oxytropis monticola*</i>						x
<i>Oxytropis nana</i> var. <i>salmonensis*</i>					x	
<i>Oxytropis podocarpa</i>				x		
<i>Parnassia fimbriata</i> var. <i>hoodiana</i>						x
<i>Parnassia kotzebuei</i>						x
<i>Parnassia palustris</i> var. <i>tenuis*</i>						x
<i>Pedicularis howellii</i>						x
<i>Pedicularis rainierensis</i>						x
<i>Pediocactus simpsonii</i> var. <i>robustior</i>			x			
<i>Pellaea andromedaefolia</i>						x
<i>Pellaea brachyptera</i>						x
<i>Pellaea breweri</i>						x
<i>Pellaea bridgesii</i>						x
<i>Pellaea mucronata</i> spp. <i>mucronata</i>						x
<i>Penstemon barrettiae</i>	x					x
<i>Penstemon compactus</i>					x	
<i>Penstemon glaucinus</i>	x					x
<i>Penstemon idahoensis</i>			x		x	
<i>Penstemon janishiae</i>			x			
<i>Penstemon lemhiensis</i>			x	x	x	
<i>Penstemon payettensis</i>				x		
<i>Penstemon peckii</i>	x					x
<i>Pentagramma triangularis</i> spp. <i>triangularis</i>				x		
<i>Peraphyllum ramosissimum</i>			x			
<i>Perideridia erythrorhiza</i>	x					x
<i>Petasites frigidus</i> var. <i>nivalis</i>				x		
<i>Petasites frigidus</i> var. <i>palmatius</i>				x		
<i>Petasites sagittatus</i>				x		
<i>Peteria thompsoniae</i>			x			



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Petrophytum cinerascens</i>	x					x
<i>Phacelia inconspicua</i>			x			
<i>Phacelia lenta</i>	x					
<i>Phacelia lutea</i> var. <i>calva</i>			x			
<i>Phacelia lutea</i> var. <i>mackenzieorum</i>	x					
<i>Phacelia minutissima</i>	x		x		x	x
<i>Phegopteris connectilis</i>				x		
<i>Phlox hendersonii</i>						x
<i>Phlox missoulensis</i> *				x		
<i>Phlox multiflora</i>						x
<i>Physaria didymocarpa</i> var. <i>didymocarpa</i>						x
<i>Physaria didymocarpa</i> var. <i>lyrata</i>			x		x	
<i>Physcia semipinnata</i>			x			
<i>Pilophorus acicularis</i>			x			
<i>Pilularia americana</i>						x
<i>Pityopus californica</i>						x
<i>Plagiobothrys figuratus</i> spp. <i>corallicarpus</i>	x					x
<i>Plagiobothrys glytocalpus</i>						x
<i>Plantago macrocarpa</i>						x
<i>Platanthera chorisiana</i>	x					x
<i>Platanthera obtusata</i>						x
<i>Platanthera sparsiflora</i>						x
<i>Pleuropogon oregonus</i>						x
<i>Poa abbreviata</i> spp. <i>marshii</i>					x	
<i>Poa laxiflora</i>	x					x
<i>Poa nervosa</i> var. <i>nervosa</i>						x
<i>Poa unilateralis</i>	x					
<i>Pogogyne floribunda</i>	x					
<i>Polemonium carneum</i>	x					x
<i>Polemonium pectinatum</i>	x					
<i>Polemonium viscosum</i>						x
<i>Polyctenium fremontii</i> var. <i>confertum</i>	x					
<i>Polygonum douglasii</i> spp. <i>austinae</i>				x		
<i>Polypodium glycyrrhiza</i>				x		
<i>Polystichum braunii</i>				x		
<i>Polystichum californicum</i>						x
<i>Potamogeton obtusifolius</i>				x		
<i>Potentilla diversifolia</i> var. <i>perdissecta</i>						x
<i>Potentilla drummondii</i> spp. <i>breweri</i> *						x
<i>Potentilla nivea</i>						x
<i>Potentilla nivea</i> var. <i>pentaphylla</i> *				x		x
<i>Potentilla villosa</i> var. <i>parviflora</i>						x
<i>Primula alcalina</i>			x		x	
<i>Primula cusickiana</i>			x			x
<i>Psathyrotes annua</i>			x			
<i>Pseudocyphellaria anthraspis</i>			x			
<i>Psilocarphus brevissimus</i>				x		
<i>Psilocarphus tenellus</i>			x			
<i>Pulsatilla patens</i> spp. <i>multifida</i> *						x
<i>Pyrrocoma hirta</i> var. <i>sonchifolia</i>			x	x		
<i>Pyrrocoma insectieruris</i> *			x		x	
<i>Pyrrocoma liatrifomis</i>	x		x			x
<i>Pyrrocoma radiata</i> *			x		x	
<i>Ranunculus austro-oreganus</i>	x					
<i>Ranunculus glaberrimus</i> var. <i>reconditus</i> *	x					x



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Ranunculus jovis</i>				x		
<i>Ranunculus populago</i>						x
<i>Rhamnus crocea</i> spp. <i>Illicifolia</i> *						x
<i>Rhizomnium nudum</i>				x		
<i>Rhynchospora alba</i>				x	x	
<i>Ribes cereum</i> var. <i>colubrinum</i>						x
<i>Ribes wolfii</i>			x			
<i>Romanzoffia thompsonii</i>	x					x
<i>Rorippa columbiae</i>	x					x
<i>Rubus arcticus</i> spp. <i>acaulis</i> *						x
<i>Rubus bartonianus</i>	x				x	x
<i>Rubus nigerrimus</i>	x					
<i>Salicornia rubra</i>			x			
<i>Salix barrattiana</i>				x		
<i>Salix candida</i>			x			x
<i>Salix delnortensis</i>						x
<i>Salix farriae</i>						x
<i>Salix glauca</i>						x
<i>Salix maccalliana</i>						x
<i>Salix pedicellaris</i>				x		
<i>Salix pseudomonticola</i>			x			x
<i>Salix sessilifolia</i>	x					
<i>Salix tweedyi</i>						x
<i>Salix vestita</i> var. <i>erecta</i>						x
<i>Salix wolfii</i> var. <i>wolfii</i>				x		
<i>Sanguisorba menziesii</i>						x
<i>Sanicula graveolens</i>			x			
<i>Sanicula marilandica</i>						x
<i>Saussurea densa</i>				x		
<i>Saxifraga adscendens</i> var. <i>oregonensis</i>						x
<i>Saxifraga bryophora</i> var. <i>tobiasiae</i>					x	
<i>Saxifraga cernua</i>						x
<i>Saxifraga hitchcockiana</i>	x					x
<i>Saxifraga tempestiva</i>				x		
<i>Saxifraga fragarioides</i>						x
<i>Scheuchzeria palustris</i> spp. <i>americana</i>				x		x
<i>Schoenoplectus subterminalis</i> *			x	x		x
<i>Scirpus pendulus</i>						x
<i>Scorpidium scorpioides</i>				x		
<i>Scribneria bolanderi</i>						x
<i>Sedum laaxum</i> spp. <i>heckneri</i>						x
<i>Sedum moranii</i>	x					x
<i>Sedum oblaneolatum</i>	x					x
<i>Senecio dimorphophyllus</i>						x
<i>Senecio flettii</i>						x
<i>Senecio hespering</i>	x					x
<i>Sidalcea campestris</i>	x					
<i>Sidalcea hirtipes</i>	x					x
<i>Sidalcea malachroides</i>						x
<i>Sidalcea malviflora</i> spp. <i>patula</i>	x					x
<i>Silene douglasii</i> var. <i>oraria</i>						x
<i>Silene hookeri</i> spp. <i>bolanderi</i>						x
<i>Silene seelyi</i>	x					x
<i>Silene spaldingii</i>	x		x			x
<i>Sisyrinchium hitchcockii</i>	x					



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Sisyrinchium sarmentosum</i>	x					x
<i>Sisyrinchium septentrionale</i>						x
<i>Sophora leachiana</i>	x					x
<i>Spartina pectinata</i>						x
<i>Sphaeromeria potentilloides</i>			x			
<i>Sphaerophorus globosus</i>			x			
<i>Sphagnum mendocinum</i>				x		
<i>Spiranthes porrifolia</i>						x
<i>Sporobolus asper</i>			x			
<i>Stanleya confertifolia</i>	x		x			
<i>Streptanthus howellii</i>	x					x
<i>Streptopus streptopoides</i> spp. <i>streptopoides</i> var. <i>brevipes</i>				x		
<i>Streptopus streptopoides</i> var. <i>brevipe</i>				x		
<i>Suksdorfia violacea</i>						x
<i>Sullivantia oregana</i>	x					x
<i>Synthyris pinnatifida</i> var. <i>lanuginosa</i>						x
<i>Synthyris platycarpa</i>				x		
<i>Talinum sediforme</i>						x
<i>Tauschia hooveri</i>	x					
<i>Tauschia howellii</i>	x					x
<i>Tauschia stricklandii</i>						x
<i>Teucrium canadense</i> var. <i>occidentale</i> *			x			
<i>Texosporium sancti-jacobi</i>			x			
<i>Thalictrum alpinum</i>				x		
<i>Thalictrum alpinum</i> var. <i>hebetum</i>						x
<i>Thalictrum dasycarpum</i>						x
<i>Thamnolia vermicularis</i>			x			
<i>Thelypodium laciniatum</i> var. <i>streptanthoides</i>			x			
<i>Thelypodium brachycarpum</i>						x
<i>Thelypodium eucosmum</i>						x
<i>Thelypodium howellii</i> spp. <i>howellii</i>						x
<i>Thelypodium repandum</i>			x		x	
<i>Thelypteris nevadensis</i>				x		
<i>Thlaspi idahoense</i> var. <i>aileniae</i>					x	
<i>Tofieldia glutinosa</i> spp. <i>brevistyla</i> *				x		
<i>Tonestus aberrans</i> *				x		
<i>Townsendia alpigena</i> *						x
<i>Townsendia parryi</i>						x
<i>Townsendia scapigera</i>			x			
<i>Trichophorum cespitosum</i> *				x		
<i>Trientalis europaea</i> spp. <i>arctica</i> *				x		
<i>Trifolium douglasii</i>	x					x
<i>Trifolium eriocephalum</i>				x		
<i>Trifolium gymnocarpon</i>				x		
<i>Trifolium leibergii</i>	x					
<i>Trifolium owyheense</i>			x			
<i>Trifolium plumosum</i> spp. <i>amplifolium</i>			x			
<i>Trifolium plumosum</i> spp. <i>plumosum</i>						x
<i>Trifolium thompsonii</i>	x					x
<i>Trillium angustipetalum</i>						x
<i>Triteleia hendersonii</i> var. <i>leachiae</i>	x					x
<i>Triteleia ixiodes</i> spp. <i>anilina</i>						x
<i>Triteleia laxa</i>						x
<i>Trollius laxus</i> var. <i>albiflorus</i>						x



Table 2. Sensitive Vertebrate and Plant Species. (continued)

Scientific Name	BLM			Forest Service Region		
	OR/WA	MT	ID	R 1	R 4	R 6
(Vascular Plants/ Bryophytes/Lichens/Fungi continued)						
<i>Ulotia megalospora</i>			x			
<i>Utricularia gibba</i>						x
<i>Utricularia intermedia</i>				x		x
<i>Vaccinium myrtilloides</i>						x
<i>Vaccinium oxycoccos</i>				x		
<i>Veratrum californicum</i>				x		
<i>Veratrum insolitum</i>						x
<i>Viola lanceolata</i> spp. <i>occidentalis</i> *	x					x
<i>Viola renifolia</i>				x		
<i>Waldsteinia idahoensis</i>			x	x		
<i>Wolffia borealis</i>						x
<i>Wolffia columbiana</i>						x
<i>Woodwardia fimbriata</i>						x
<i>Xanthoparmelia idahoensis</i>			x		x	

\* Updated names based on the PLANTS national database as of July 1999.

#### SOURCES:

##### BLM State Lists:

*Idaho* - Mallet, J. and Hahn, M.G. 1996. Sensitive Species Supplement to the Master Memorandum of Understanding Between the Idaho Department of Fish and Game and the Bureau of Land Management, signed by Director, Idaho Fish and Game and Idaho State Director, BLM; attachments: Sensitive Species List-Animals, Sensitive Species List-Plants. List covers only those BLM districts that lie wholly or in part within the ICBEMP project area. Updated July 1999.

*Montana* - (1) US Fish & Wildlife Service. 1996. Memorandum to Deputy State Director, Division of Resources, Montana State Office, BLM, from Field Supervisor, Montana Field Office, USDI Fish and Wildlife Service, regarding Section 7 Consultation-Implementation of Standards for Rangeland Health, Appendix F and Appendix G, Helena, Montana, USDI Fish and Wildlife Service, Ecological Services. (2) USDI Bureau of Land Management, Manual 6840 Supplement, Special Status Species Management, April 8, 1996, 31 pp. (3) D. McCleerey, BLM Garnet Resource Area, Butte District, personal communication 3/14/97. List covers only those BLM districts that lie wholly or in part within the ICBEMP project area. Updated July 1999.

*Oregon/Washington* - (1) BLM Oregon/Washington Special Status Species Database. 1997. (2) B.Hill, BLM State Office Special Status Species Biologist, personal communication, 3/17/97. List covers only those BLM districts that lie wholly or in part within the ICBEMP project area. Updated July 1999.

##### Forest Service Region Lists:

R1 - Jolly, D. F. 1994. Update of Northern Region Sensitive Species List (1994), Memorandum to Forest Supervisors from Regional Forester, dated June 10, 1994; attachments: (a) TES List Update Changes, Northern Region Final, 6/94 (2 pp); (b) Regional Briefing, Final Region 1 Sensitive Species Update, Summary 1994 (2 pp); (c) Table 1-Wildlife, Fish and Sensitive Plants, June 94, Final (14 pp). List is for only those National Forests in Region 1 that lie wholly or in part within the ICBEMP Project Area. Updated July 1999.

R4 - (1) Wildlife, Fish & Rare Plant Staff, R4, 1995. Updated Proposed, Endangered, Threatened, and Sensitive (PETS) Species List for R4, Memorandum from T. C. Lanier, dated 11/95; attachment: Intermountain Region Proposed, Endangered, Threatened, and Sensitive Species (11/95 Update), Known/Suspected Distribution By Forest (23 pp). (2) K. Ramsey, Fisheries Biologist, Humboldt National Forest, 3/17/97. Lists are for only those National Forests that lie wholly or in part within the ICBEMP Project Area. Updated July 1999.

R6 - (1) Document 12670 ID 90-1, Sensitive Animal List, Region 6, U.S. Forest Service, revised March 1989, with annotations dated 12/30/96; Sensitive Plant List, Region 6, U.S. Forest Service, Revised March 1991, with annotations dated 12/30/96 (37 pp). (2) P. Ormsbee, Wildlife Ecologist, Willamette National Forest, personal communication, 3/18/97. Lists are for only those National Forests that lie wholly or in part within the ICBEMP Project Area. Updated July 1999.



**Table 3. Terrestrial Vertebrate Species of Focus Used in the Evaluation of Alternatives.**

Class <sup>1</sup>	Common name	Scientific name	Modeled <sup>2</sup>	Scale <sup>3</sup>
R	Mojave black-collared lizard	<i>Crotaphytus bicinctores</i>		BS
R	Longnose leopard lizard	<i>Gambelia wislizenii</i>		BS
R	Sharptail snake	<i>Contia tenuis</i>		BS
R	Striped whipsnake	<i>Masticophis taeniatus</i>	x	BS
R	California mountain kingsnake	<i>Lampropeltis zonata</i>		BS
R	Longnose snake	<i>Rhinocheilus lecontei</i>		BS
R	Ground snake	<i>Sonora semiannulata</i>		BS
B	Goshawk (summer and winter)	<i>Accipiter gentilis</i>	x	BS
B	Ferruginous hawk	<i>Buteo regalis</i>		BS
B	Blue grouse	<i>Dendrogapus obscurus</i>	x	BS
B	Sage grouse (summer and winter)	<i>Centrocercus urophasianus</i>	x	BS
B	Columbian sharp-tailed grouse (summer)	<i>Tympanuchus phasianellus columbianus</i>	x	BS
B	Mountain quail	<i>Oreortyx pictus</i>		BS
B	Flammulated owl	<i>Otus flammeolus</i>	x	BS
B	Burrowing owl	<i>Athene cunicularia</i>		BS
B	Great gray owl	<i>Strix nebulosa</i>		BS
B	Long-eared owl	<i>Asio otus</i>		BS
B	Short-eared owl	<i>Asio flammeus</i>	x	BS
B	Boreal owl	<i>Aegolius funereus</i>		BS
B	Vaux's swift	<i>Chaetura vauxi</i>		BS
B	Rufous hummingbird	<i>Selasphorus rufus</i>	x	BS
B	Black-chinned hummingbird	<i>Archilochus alexandri</i>		BS
B	Broad-tailed hummingbird	<i>Selasphorus platycercus</i>		BS
B	Lewis' woodpecker	<i>Melanerpes lewis</i>	x	BS
B	Williamson's sapsucker	<i>Sphyrapicus thyroideus</i>		BS
B	White-headed woodpecker	<i>Picoides albolarvatus</i>		BS
B	Three-toed woodpecker	<i>Picoides tridactylus</i>		BS
B	Black-backed woodpecker	<i>Picoides arcticus</i>	x	BS
B	Pileated woodpecker	<i>Dryocopus pileatus</i>		BS
B	Olive-sided flycatcher	<i>Contopus cooperi</i>		BS
B	Hammond's flycatcher	<i>Empidonax hammondii</i>		BS
B	Ash-throated flycatcher	<i>Myiarchus cinerascens</i>	x	BS
B	Chestnut-backed chickadee	<i>Parus rufescens</i>		BS
B	Bushtit	<i>Psaltiriparus minimus</i>		BS
B	White-breasted nuthatch	<i>Sitta carolinensis</i>		BS
B	Pygmy nuthatch	<i>Sitta pygmaea</i>	x	BS
B	Brown creeper	<i>Certhia americana</i>		BS
B	Winter wren	<i>Troglodytes troglodytes</i>		BS
B	Golden-crowned kinglet	<i>Regulus satrapa</i>		BS
B	Western bluebird	<i>Sialia mexicana</i>	x	BS
B	Varied thrush	<i>Ixoreus naevius</i>		BS
B	Sage thrasher	<i>Oreoscoptes montanus</i>		BS
B	Loggerhead shrike	<i>Lanius ludovicianus</i>		BS
B	Hermit warbler	<i>Dendroica occidentalis</i>		BS
B	Lazuli bunting	<i>Passerina amoena</i>	x	BS/FS
B	Clay-colored sparrow	<i>Spizella pallida</i>		BS
B	Brewer's sparrow	<i>Spizella breweri</i>	x	BS
B	Vesper sparrow	<i>Poocetes gramineus</i>		BS
B	Lark sparrow	<i>Chondestes grammacus</i>		BS
B	Black-throated sparrow	<i>Amphispiza bilineata</i>		BS
B	Sage sparrow	<i>Amphispiza belli</i>		BS
B	Lark bunting	<i>Calamospiza melanocorys</i>		BS
B	Grasshopper sparrow	<i>Ammodramus savannarum</i>	x	BS
B	Western meadowlark	<i>Sturnella neglecta</i>		BS
B	Brown-headed cowbird	<i>Molothrus ater</i>	x	BS
B	Black rosy finch	<i>Leucosticte arctoa</i>		BS



**Table 3. Terrestrial Vertebrate Species of Focus Used in the Evaluation of Alternatives. (continued)**

Class <sup>1</sup>	Common name	Scientific name	Modeled <sup>2</sup>	Scale <sup>3</sup>
B	Gray-crowned rosy finch	<i>Leucosticte tephrocotis</i>		BS
B	White-winged crossbill	<i>Loxia leucoptera</i>		BS
B	Pine siskin	<i>Carduelis pinus</i>		BS
M	Preble's shrew	<i>Sorex preblei</i>		BS
M	Pygmy shrew	<i>Sorex hoyi</i>		BS
M	Yuma myotis	<i>Myotis yumanensis</i>		BS
M	Long-eared myotis	<i>Myotis evotis</i>	x	BS
M	Fringed myotis	<i>Myotis thysanodes</i>		BS
M	Long-legged myotis	<i>Myotis volans</i>		BS
M	Western small-footed myotis	<i>Myotis ciliolabrum</i>		BS
M	Silver-haired bat	<i>Lasionycteris noctivagans</i>		BS
M	Hoary bat	<i>Lasiurus cinereus</i>	x	BS
M	Spotted bat	<i>Euderma maculatum</i>		BS
M	Townsend's big-eared bat	<i>Corynorhinus townsendii pallescens</i>		BS
M	Pallid bat	<i>Antrozous pallidus</i>		BS
M	Pygmy rabbit	<i>Brachylagus idahoensis</i>		BS
M	Idaho ground squirrel	<i>Spermophilus brunneus</i>		BS
M	White-tailed antelope squirrel	<i>Ammospermophilus leucurus</i>		BS
M	Washington ground squirrel	<i>Spermophilus washingtoni</i>	x	BS
M	Wyoming ground squirrel	<i>Spermophilus elegans</i>		BS
M	Uinta ground squirrel	<i>Spermophilus armatus</i>		BS
M	Western gray squirrel	<i>Sciurus griseus</i>		BS
M	Northern flying squirrel	<i>Glaucomys sabrinus</i>		BS
M	Sagebrush vole	<i>Lemmys curtatus</i>		BS
M	Gray wolf	<i>Canis lupus</i>	x	BS
M	Kit fox	<i>Vulpes velox</i>		BS
M	Grizzly bear	<i>Ursus arctos</i>	x	BS
M	American marten	<i>Martes americana</i>	x	BS
M	Fisher	<i>Martes pennanti</i>		BS
M	Wolverine	<i>Gulo gulo</i>	x	BS
M	Lynx	<i>Lynx lynx</i>	x	BS
M	Woodland caribou	<i>Rangifer tarandus caribou</i>	x	BS
M	Pronghorn	<i>Antilocapra americana</i>	x	BS
M	Mountain goat	<i>Oreamnos americanus</i>		BS
M	California bighorn sheep	<i>Ovis canadensis californiana</i>		BS
M	Rocky mountain bighorn sheep (summer and winter)	<i>Ovis canadensis canadensis</i>	x	BS
A	Coeur d'alene salamander	<i>Plethodon idahoensis</i>	x	FS
A	Larch mountain salamander	<i>Plethodon larselli</i>		FS
A	Idaho giant salamander	<i>Dicamptodon aterrimus</i>	x	FS
A	Tailed frog	<i>Ascaphus truei</i>	x	FS
A	Western toad	<i>Bufo boreas</i>	x	FS
A	Woodhouse's toad	<i>Bufo woodhousii</i>		FS
A	Northern leopard frog	<i>Rana pipiens</i>		FS
A	Columbian spotted frog	<i>Rana luteiventris</i>	x	FS
A	Oregon spotted frog	<i>Rana pretiosa</i>	x	FS
R	Western pond turtle	<i>Clemmys marmorata</i>	x	FS
R	Painted turtle	<i>Chrysemys picta</i>		FS
R	Rubber boa	<i>Charina bottae</i>	x	FS
R	Common garter snake	<i>Thamnophis sirtalis</i>	x	FS
B	Columbian sharp-tailed grouse(winter)	<i>Tympanuchus phasianellus columbianus</i>	x	FS
B	Common loon	<i>Gavia immer</i>		FS
B	Red-necked grebe	<i>Podiceps grisegena</i>		FS
B	Western grebe	<i>Aechmophorus occidentalis</i>		FS



**Table 3. Terrestrial Vertebrate Species of Focus Used in the Evaluation of Alternatives. (continued)**

Class <sup>1</sup>	Common name	Scientific name	Modeled <sup>2</sup>	Scale <sup>3</sup>
B	Clark's grebe	<i>Aechmophorus clarkii</i>		FS
B	American white pelican	<i>Pelecanus erythrorhynchos</i>		FS
B	American bittern	<i>Botaurus lentiginosus</i>		FS
B	Western least bittern	<i>Ixobrychus exilis hesperis</i>		FS
B	Great blue heron	<i>Ardea herodias</i>		FS
B	Great egret	<i>Casmerodius albus</i>		FS
B	Snowy egret	<i>Egretta thula</i>		FS
B	Black-crowned night heron	<i>Nycticorax nycticorax</i>		FS
B	White-faced ibis	<i>Plegadis chihi</i>		FS
B	Trumpeter swan	<i>Cygnus buccinator</i>		FS
B	Wood duck	<i>Aix sponsa</i>	x	FS
B	Green-winged teal	<i>Anas crecca</i>		FS
B	Mallard	<i>Anas platyrhynchos</i>		FS
B	Northern pintail	<i>Anas acuta</i>		FS
B	Blue-winged teal	<i>Anas discors</i>		FS
B	Cinnamon teal	<i>Anas cyanoptera</i>		FS
B	Northern shoveler	<i>Anas clypeata</i>		FS
B	Gadwall	<i>Anas strepera</i>		FS
B	American wigeon	<i>Anas americana</i>		FS
B	Canvasback	<i>Aythya valisineria</i>		FS
B	Redhead	<i>Aythya americana</i>		FS
B	Ring-necked duck	<i>Aythya collaris</i>		FS
B	Lesser scaup	<i>Aythya affinis</i>		FS
B	Harlequin duck	<i>Histrionicus histrionicus</i>	x	FS
B	Common goldeneye	<i>Bucephala clangula</i>	x	FS
B	Barrow's goldeneye	<i>Bucephala islandica</i>	x	FS
B	Bufflehead	<i>Bucephala albeola</i>	x	FS
B	Hooded merganser	<i>Lophodytes cucullatus</i>	x	FS
B	Common merganser	<i>Mergus merganser</i>	x	FS
B	Ruddy duck	<i>Oxyura jamaicensis</i>		FS
B	Bald eagle	<i>Haliaeetus leucocephalus</i>	x	FS
B	Yellow rail	<i>Coturnicops noveboracensis</i>		FS
B	Virginia rail	<i>Rallus limicola</i>		FS
B	Sora	<i>Porzana carolina</i>		FS
B	Greater sandhill crane	<i>Grus canadensis tabida</i>		FS
B	Western snowy plover	<i>Charadrius alexandrinus nivosus</i>		FS
B	Black-necked stilt	<i>Himantopus mexicanus</i>		FS
B	American avocet	<i>Recurvirostra americana</i>		FS
B	Willet	<i>Catoptrophorus semipalmatus</i>		FS
B	Spotted sandpiper	<i>Actitis macularia</i>		FS
B	Upland sandpiper	<i>Bartramia longicauda</i>	x	FS
B	Long-billed curlew	<i>Numenius americanus</i>		FS
B	Common snipe	<i>Gallinago gallinago</i>	x	FS
B	Wilson's phalarope	<i>Phalaropus tricolor</i>		FS
B	Forster's tern	<i>Sterna forsteri</i>		FS
B	Black tern	<i>Chlidonias niger</i>		FS
B	Yellow-billed cuckoo	<i>Coccyzus americanus</i>	x	FS
B	Western screech owl	<i>Otus kennicottii</i>	x	FS
B	Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>	x	FS
B	Downy woodpecker	<i>Picoides pubescens</i>	x	FS
B	Willow flycatcher	<i>Empidonax traillii</i>	x	FS
B	Least flycatcher	<i>Empidonax minimus</i>		FS
B	Veery	<i>Catharus fuscescens</i>	x	FS
B	Red-eyed vireo	<i>Vireo olivaceus</i>	x	FS
B	Virginia's warbler	<i>Vermivora virginiae</i>		FS
B	Yellow warbler	<i>Dendroica petechia</i>	x	FS



**Table 3. Terrestrial Vertebrate Species of Focus Used in the Evaluation of Alternatives. (continued)**

Class <sup>1</sup>	Common name	Scientific name	Modeled <sup>2</sup>	Scale <sup>3</sup>
B	American redstart	<i>Setophaga ruticilla</i>	x	FS
B	Wilson's warbler	<i>Wilsonia pusilla</i>	x	FS
B	Yellow-breasted chat	<i>Icteria virens</i>	x	FS
B	Fox sparrow	<i>Passerella iliaca</i>	x	FS
B	Bobolink	<i>Dolichonyx oryzivorus</i>	x	FS
B	Tricolored blackbird	<i>Agelaius tricolor</i>	x	FS
B	Brewer's blackbird	<i>Euphagus cyanocephalus</i>	x	FS
M	Water shrew	<i>Sorex palustris</i>		FS
M	Water vole	<i>Microtus richardsoni</i>		FS
M	Northern bog lemming	<i>Synaptomys borealis</i>		FS

<sup>1</sup> Class - B = bird; M = mammal; R = reptile; and A = amphibian.

<sup>2</sup> species used for modeling portion of evaluation of alternatives.

<sup>3</sup> Scale - BS: Broad-scale species of focus assessed. Ninety-one species were identified as broad-scale vertebrates of focus, whose source habitats could reliably be evaluated by using a mapping unit (pixel size) of 100 hectares (254 acres).

FS: Fine-scale species of focus, whose source habitats require mapping units <100 hectares (254 acres).

Source: Table 1 Volume 1 Wisdom et. al. (in press)



Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives.

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
N	<i>Aspicilia fruticulosa</i>	G3				X
N	<i>Bryoria subdivergens</i>	G2			X	
N	<i>Bryoria tortuosa</i>	G?	X			
N	<i>Bryum calobryoides</i>	G3				X
N	<i>Buxbaumia aphylla</i>	G3				X
N	<i>Cladonia anderegii</i>	G1				X
N	<i>Cladonia imbricarica</i>	G2G3				X
N	<i>Cladonia luteoalba</i>	G2				X
N	<i>Cladonia verruculosa</i>	G3				X
N	<i>Collema curtisporum</i>	G1				X
N	<i>Dermatocarpon lorenzianum</i>	G2				X
N	<i>Dicranella heteromalla</i>	G?			X	
N	<i>Dicranum acutifolium</i>	G?			X	
N	<i>Grimmia mollis</i>	G3G5			X	
N	<i>Heterotheca barbata</i>	G1G3				X
N	<i>Heterotheca villosa</i> var. <i>depressa</i>	G5T3				X
N	<i>Hygrohypnum cochlearifolium</i>	G?			X	
N	<i>Hypnum recurvatum</i>	G3G5			X	
N	<i>Lobaria scrobiculata</i>	G3G4				X
N	<i>Meesia longiseta</i>	G3G4				X
N	<i>Orthotrichum hallii</i>	G3G5				X
N	<i>Orthotrichum holzingeri</i>	G2				X
N	<i>Orthotrichum praemorsum</i>	G?			X	
N	<i>Pseudocrossidium obtusulum</i>	G?			X	
N	<i>Ramalina thrausta</i>	G?				X
N	<i>Sphaerocarpos hians</i>	G2				X
N	<i>Texasporium sancti-jacobi</i>	G2	X	X		X
N	<i>Thamnolia vermicularis</i>	G?				X
N	<i>Thelomma ocellatum</i>	G?				X
N	<i>Tortula bartramii</i>	G2G4			X	
N	<i>Ulotia curvifolia</i>	G3G5				X
N	<i>Ulotia megalospora</i>	G?				X
N	<i>Umbilicaria vellea</i>	G3	X			
N	<i>Xanthoparmelia idahoensis</i>	G2				X
V	<i>Achnatherum hendersonii</i>	G3		X		
V	<i>Achnatherum wallowaensis</i>	G2		X		
V	<i>Adiantum aleuticum</i> subalpine ecotype	G5?T2Q				X
V	<i>Agastache cusickii</i>	G3G4		X		
V	<i>Allium aaseae</i>	G3				X
V	<i>Allium columbianum</i>	G3			X	
V	<i>Allium constrictum</i>	G2	X			
V	<i>Allium dictuon</i>	G1	X			
V	<i>Allium madidum</i>	G3				X
V	<i>Allium robinsonii</i>	G3		X		
V	<i>Allium tolmiei</i> var. <i>persimile</i>	G4T3				X
V	<i>Allium tolmiei</i> var. <i>platyphyllum</i>	G4T3Q				X
V	<i>Amsinckia carinata</i>	G2		X		
V	<i>Antennaria arcuata</i>	G2				X
V	<i>Antennaria densifolia</i>	G3			X	
V	<i>Arabis fecunda</i>	G2			X	
V	<i>Arabis hastatula</i>	G1		X		X



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Arabis lasiocarpa</i>	G1				x
V	<i>Arabis sparsiflora</i> var. <i>atrorubens</i>	G5T3		x		
V	<i>Artemisia campestris</i> spp. <i>borealis</i>	G5T1	x			
V	<i>Artemisia campestris</i> var. <i>wormskioldii</i>	G5T1		x		
V	<i>Artemisia ludoviciana</i> spp. <i>estesii</i>	G5T2		x		
V	<i>Artemisia packardiae</i>	G3				x
V	<i>Artemisia papposa</i>	G3		x		x
V	<i>Aster jessicae</i>	G2	x			x
V	<i>Astragalus amblytropis</i>	G3				x
V	<i>Astragalus amnis-amissi</i>	G3				x
V	<i>Astragalus anserinus</i>	G2				x
V	<i>Astragalus applegatei</i>	G1		x		
V	<i>Astragalus aquilonius</i>	G3				x
V	<i>Astragalus arrectus</i>	G2G3	x			
V	<i>Astragalus</i> var. <i>inseptus</i>	G4T3				x
V	<i>Astragalus atratus</i> var. <i>owyheensis</i>	G4T3				x
V	<i>Astragalus beckwithii</i> var. <i>sulcatus</i>	G4T3				x
V	<i>Astragalus camptopus</i>	G3				x
V	<i>Astragalus ceramicus</i> var. <i>apus</i>	G4T3				x
V	<i>Astragalus collinus</i> var. <i>laurentii</i>	G5T1		x		
V	<i>Astragalus columbianus</i>	G2	x			
V	<i>Astragalus cusickii</i> var. <i>packardiae</i>	G5T1				x
V	<i>Astragalus cusickii</i> var. <i>sterilis</i>	G5T2				x
V	<i>Astragalus diaphanus</i> var. <i>diurnus</i>	G4T2		x		
V	<i>Astragalus diversifolius</i>	G3				x
V	<i>Astragalus jejunos</i>	G3G4				x
V	<i>Astragalus jejunos</i> var. <i>jejunos</i>	G3G4T3?				x
V	<i>Astragalus misellus</i> var. <i>pauper</i>	G4T3	x			
V	<i>Astragalus mulfordiae</i>	G2		x		x
V	<i>Astragalus oniciformis</i>	G3				x
V	<i>Astragalus paysonii</i>	G3				x
V	<i>Astragalus peckii</i>	G3		x		
V	<i>Astragalus pulsiferae</i> var. <i>suksdorfii</i>	G4T3?	x			
V	<i>Astragalus purshii</i> var. <i>ophiogenes</i>	G5T3				x
V	<i>Astragalus riparius</i>	G2	x			x
V	<i>Astragalus scaphoides</i>	G3				x
V	<i>Astragalus sinuatus</i>	G1	x			
V	<i>Astragalus sterilis</i>	G2Q		x		x
V	<i>Astragalus tegetarioides</i>	G3		x		
V	<i>Astragalus tyghensis</i>	G2		x		
V	<i>Astragalus vexilliflexus</i> var. <i>nubilus</i>	G4T2				x
V	<i>Astragalus yoder-williamsii</i>	G3				x
V	<i>Bolandra oregana</i>	G3	x			
V	<i>Botrychium ascendens</i>	G3	x	x	x	x
V	<i>Botrychium campestre</i>	G3	x	x	x	
V	<i>Botrychium crenulatum</i>	G3	x	x	x	x
V	<i>Botrychium hesperium</i>	G3	x		x	
V	<i>Botrychium lineare</i>	G1	x	x	x	x
V	<i>Botrychium montanum</i>	G3		x	x	x
V	<i>Botrychium pallidum</i>	G2			x	
V	<i>Botrychium paradoxum</i>	G2	x	x	x	x



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Botrychium pedunculatum</i>	G2?	x	x	x	x
V	<i>Botrychium pumicola</i>	G3		x		
V	<i>Botrychium spathulatum</i>	G3G4			x	
V	<i>Calamagrostis tweedyi</i>	G2G3			x	x
V	<i>Calochortus greenii</i>	G2		x		
V	<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i>	G3T3	x			
V	<i>Calochortus longebarbatus</i> var. <i>peckii</i>	G3T3		x		
V	<i>Calochortus macrocarpus</i> var. <i>maculosus</i>	G5T2	x	x		x
V	<i>Calochortus nitidus</i>	G3	x			x
V	<i>Camissonia palmeri</i>	G3G4				x
V	<i>Camissonia pygmaea</i>	G3	x	x		
V	<i>Cardamine constancei</i>	G3				x
V	<i>Carex lenticularis</i> var. <i>dolia</i>	G5T3Q			x	
V	<i>Carex luzulina</i> var. <i>atropurpurea</i>	G5T3				x
V	<i>Carex Parryana</i> spp. <i>Idaho</i>	G4T2			x	x
V	<i>Carex stenoptila</i>	G3?			x	
V	<i>Castilleja cervina</i>	G3G4			x	
V	<i>Castilleja chlorotica</i>	G3		x		
V	<i>Castilleja christii</i>	G1				x
V	<i>Castilleja covilleana</i>	G3G4			x	
V	<i>Castilleja cryptantha</i>	G2	x			
V	<i>Castilleja fraterna</i>	G2		x		
V	<i>Castilleja oresbia</i>	G3G4				x
V	<i>Castilleja pilosa</i> var. <i>steenensis</i>	G4?T3		x		
V	<i>Castilleja pulchella</i>	G3				x
V	<i>Castilleja rubida</i>	G2		x		
V	<i>Castilleja thompsonii</i>	G3G4		x		
V	<i>Caulanthus major</i> var. <i>nevadensis</i>	G3?T?		x		
V	<i>Cetraria subalpina</i>	G2G3				x
V	<i>Chaenactis cusickii</i>	G2G3		x		x
V	<i>Chaenactis thompsonii</i>	G2G3	x			
V	<i>Chrysothamnus parryi</i> spp. <i>montanus</i>	G5T1				x
V	<i>Chrysothamnus parryi</i> spp. <i>salmonensis</i>	G5T3				x
V	<i>Collomia debilis</i> var. <i>camporum</i>	G5T3				x
V	<i>Collomia macrocalyx</i>	G3G4	x			
V	<i>Collomia mazama</i>	G3		x		
V	<i>Collomia renacta</i>	G1Q		x		
V	<i>Corydalis caseana</i> spp. <i>hastata</i>	G5T3				x
V	<i>Crepis bakeri</i> spp. <i>idahoensis</i>	G4T2				x
V	<i>Cryptantha caespitosa</i>	G3				x
V	<i>Cryptantha hypsophila</i>	G3G4				x
V	<i>Cryptantha leucophaea</i>	G2G3	x	x		
V	<i>Cryptantha salmonensis</i>	G3				x
V	<i>Cymopterus acaulis</i> var. <i>greeleyorum</i>	G5T2				x
V	<i>Cymopterus davisii</i>	G3				x
V	<i>Cymopterus douglassii</i>	G3				x
V	<i>Dasynotus daubenmirei</i>	G3				x
V	<i>Delphinium viridescens</i>	G2	x			
V	<i>Douglasia idahoensis</i>	G2				x
V	<i>Draba argyrea</i>	G3				x
V	<i>Draba globosa</i>	G3				x



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Draba macounii</i>	G3G4			x	
V	<i>Draba trichocarpa</i>	G1G2				x
V	<i>Erigeron basalticus</i>	G1	x			
V	<i>Erigeron eatonii</i> var. <i>lavandulus</i>	G5T3				x
V	<i>Erigeron engelmannii</i> var. <i>davisii</i>	G5T2		x		x
V	<i>Erigeron lackschewitzii</i>	G3Q			x	
V	<i>Erigeron latus</i>	G2				x
V	<i>Erigeron piperianus</i>	G3	x			
V	<i>Erigeron radicans</i>	G3				x
V	<i>Erigeron salishii</i>	G2	x			
V	<i>Erigeron salmonensis</i>	G3				x
V	<i>Eriogonum capistratum</i> var. <i>welshii</i>	G4T2				x
V	<i>Eriogonum chrysops</i>	G1		x		
V	<i>Eriogonum codium</i>	G1	x			
V	<i>Eriogonum crosbyae</i>	G3		x		
V	<i>Eriogonum cusickii</i>	G2		x		
V	<i>Eriogonum desertorum</i>	G3G4				x
V	<i>Eriogonum meledonum</i>	G1				x
V	<i>Eriogonum ochrocephalum</i> var. <i>calcareum</i>	G4T3				x
V	<i>Eriogonum prociduum</i>	G3		x		
V	<i>Eriogonum salicornioides</i>	G3?		x		x
V	<i>Eriogonum shockleyi</i> var. <i>packardiae</i>	G5T2				x
V	<i>Eriogonum</i> spp. Nov. (War eagle mountain)	G1Q				x
V	<i>Erythronium grandiflorum</i> spp. <i>nudipetalum</i>	G5T3				x
V	<i>Frasera albicaulis</i> var. <i>idahoensis</i>	G5T3Q				x
V	<i>Galium serpenticum</i> spp. <i>warnerense</i>	G4G5T2Q		x		
V	<i>Geum rossii</i> var. <i>depressum</i>	G5T1	x			
V	<i>Gratiola heterosepala</i>	G3		x		
V	<i>Grindelia howellii</i>	G3			x	x
V	<i>Hackelia cronquistii</i>	G2		x		x
V	<i>Hackelia davisii</i>	G3				x
V	<i>Hackelia diffusa</i> var. <i>diffusa</i>	G4T2	x			
V	<i>Hackelia hispida</i> var. <i>disjuncta</i>	G4T2T3	x			
V	<i>Hackelia ophiobia</i>	G2G3		x		x
V	<i>Hackelia</i> spp. Nov. (Sleeping deer mountain)	G1Q				x
V	<i>Hackelia venusta</i>	G1	x			
V	<i>Halimolobos perplexa</i> var. <i>perplexa</i>	G4T3				x
V	<i>Haplopappus aberrans</i>	G3			x	x
V	<i>Haplopappus hirtus</i> var. <i>sonchifolius</i>	G4G5T3?				x
V	<i>Haplopappus insecticuriis</i>	G3				x
V	<i>Haplopappus integrifolius</i>	G3?				x
V	<i>Haplopappus liatrisformis</i>	G2	x			x
V	<i>Haplopappus radiatus</i>	G3		x		x
V	<i>Haplopappus uniflorus</i> var. <i>howellii</i>	G5T1				x
V	<i>Heuchera grossulariifolia</i> var. <i>tenuifolia</i>	G4T3?	x			
V	<i>Howellia aquatilis</i>	G2	x		x	x
V	<i>Hymenoxys lemmonii</i>	G3?		x		
V	<i>Iliamna longisepala</i>	G3	x			
V	<i>Ipomopsis minutiflora</i>	G2G3			x	
V	<i>Ivesia rhypara</i> var. <i>rhypara</i>	G2T1		x		
V	<i>Ivesia rhypara</i> var. <i>shellyi</i>	G2T1		x		



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Ivesia shockleyi</i>	G3G4		x		
V	<i>Juncus kelloggii</i>	G3?	x			
V	<i>Juncus tweedyi</i>	G3				x
V	<i>Juncus uncialis</i>	G3G4	x			
V	<i>Lepidium davisii</i>	G3		x		x
V	<i>Lepidium papilliferum</i>	G2				x
V	<i>Leptodactylon glabrum</i>	G2				x
V	<i>Leptodactylon pungens</i> spp. <i>hazeliae</i>	G5T1		x		x
V	<i>Lesquerella carinata</i> var. <i>languida</i>	G3G4T1			x	
V	<i>Lesquerella humilis</i>	G1			x	
V	<i>Lesquerella kingii</i> var. <i>cobrensis</i>	G5T3?				x
V	<i>Lesquerella multiceps</i>	G3				x
V	<i>Lesquerella paysonii</i>	G3			x	x
V	<i>Lesquerella tuplashensis</i>	G1	x			
V	<i>Limnanthes floccosa</i> spp. <i>bellingeriana</i>	G4T2		x		
V	<i>Lomatium erythrocarpum</i>	G1		x		
V	<i>Lomatium geyeri</i>	G3G4			x	
V	<i>Lomatium greenmanii</i>	G1		x		
V	<i>Lomatium laevigatum</i>	G3	x			
V	<i>Lomatium ochocense</i>	G2G3		x		
V	<i>Lomatium packardiae</i>	G2?				x
V	<i>Lomatium rollinsii</i>	G3	x			x
V	<i>Lomatium salmoniflorum</i>	G3		x		x
V	<i>Lomatium suksdorfii</i>	G3	x	x		
V	<i>Lomatium tuberosum</i>	G2	x			
V	<i>Luina serpentina</i>	G2		x		
V	<i>Lupinus lepidus</i> var. <i>sellulus</i>	G4T2				x
V	<i>Lunpinus lyallii</i> spp. <i>alics-temporis</i>	G5T1?				x
V	<i>Lupinus sericeus</i> var. <i>egglestonianus</i>	G5T2T4Q		x		
V	<i>Meconella oregana</i>	G2	x	x		
V	<i>Mentzelia mollis</i>	G2		x		x
V	<i>Mentzelia packardiae</i>	G1		x		
V	<i>Mentzelia torreyi</i> var. <i>acerosa</i>	G4T3				x
V	<i>Mimulus ampliatus</i>	G1				x
V	<i>Mimulus evanescens</i>	G3?		x		x
V	<i>Mimulus hymenophyllus</i>	G1		x		x
V	<i>Mimulus jungermannioides</i>	G2	x	x		
V	<i>Mimulus patulus</i>	G2Q			x	x
V	<i>Mirabilis macfarlanei</i>	G2		x		x
V	<i>Musineon lineare</i>	G2				x
V	<i>Myosurus sessilis</i>	G2		x		
V	<i>Oenothera psammophila</i>	G3				x
V	<i>Orthocarpus bracteosus</i>	G3?	x			
V	<i>Oxytropis besseyi</i> var. <i>salmonensis</i>	G5T3				x
V	<i>Oxytropis campestris</i> var. <i>columbiana</i>	G5T3	x		x	
V	<i>Oxytropis campestris</i> var. <i>wanapum</i>	G5T1	x			
V	<i>Papaver radicans</i> spp. <i>kluanense</i>	G3?Q				x
V	<i>Pedicularis contorta</i> var. <i>rubicunda</i>	G5T2			x	
V	<i>Pedicularis rainierensis</i>	G2G3	x			
V	<i>Penstemon barrettiae</i>	G2	x	x		
V	<i>Penstemon compactus</i>	G2G3				x



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Penstemon deustus</i> var. <i>variabilis</i>	G5T2	x			
V	<i>Penstemon glaucinus</i>	G3		x		
V	<i>Penstemon idahoensis</i>	G1				x
V	<i>Penstemon lemhiensis</i>	G3			x	x
V	<i>Penstemon peckii</i>	G3		x		
V	<i>Perideridia erythrorhiza</i>	G1		x		
V	<i>Petrophyton cinerascens</i>	G1	x			
V	<i>Phacelia inconspicua</i>	G2				x
V	<i>Phacelia lenta</i>	G2	x			
V	<i>Phacelia lutea</i> var. <i>calva</i>	G4T2				x
V	<i>Phacelia lutea</i> var. <i>mackenziorum</i>	G4T3		x		
V	<i>Phacelia lyallii</i>	G3				x
V	<i>Phacelia minutissima</i>	G3	x	x		x
V	<i>Phlox idahonis</i>	G1				x
V	<i>Phlox kelseyi</i> var. <i>missoulensis</i>	G2			x	
V	<i>Physaria didymocarpa</i> var. <i>lyrata</i>	G5T1				x
V	<i>Physaria integrifolia</i>	G3G4				x
V	<i>Physaria integrifolia</i> var. <i>monticola</i>	G3G4T2Q				x
V	<i>Plagiobothrys salsus</i>	G3G4		x		
V	<i>Pleuropogon oregonus</i>	G1		x		
V	<i>Poa abbreviata</i> spp. <i>marshii</i>	G5T1				x
V	<i>Polemonium pectinatum</i>	G2	x			
V	<i>Potamogeton foliosus</i> var. <i>fibrillosus</i>	G5T2T4		x		
V	<i>Primula alcalina</i>	G1				x
V	<i>Primula brodiaeae</i>	G2				x
V	<i>Primula wilcoxiana</i>	G3				x
V	<i>Ranunculus reconditus</i>	G2	x	x		
V	<i>Ribes cereum</i> var. <i>colubrinum</i>	G5T3	x			
V	<i>Ribes oxycanthoides</i> spp. <i>irriguum</i>	G5T3T4	x			
V	<i>Ribes velutinum</i> var. 1	G5T3				x
V	<i>Rorippa columbiae</i>	G3	x	x		
V	<i>Rubus bartonianus</i>	G2		x		x
V	<i>Rubus nigerrimus</i>	G1	x			
V	<i>Salix tweedyi</i>	G3?	x			
V	<i>Saussurea densa</i>	G3G5			x	
V	<i>Saussurea weberi</i>	G3Q			x	
V	<i>Saxifraga bryophora</i> var. <i>tobiasiae</i>	G5T1				x
V	<i>Saxifraga tempestiva</i>	G2			x	
V	<i>Saxifragopsis fragarioides</i>	G3?	x			
V	<i>Scirpus rollandii</i>	G3Q				x
V	<i>Scribneria bolanderi</i>	G3G4		x		
V	<i>Senecio ertterae</i>	G1		x		
V	<i>Senecio streptanthifolius</i> var. <i>laetiflorus</i>	G5T3				x
V	<i>Sidalcea oregana</i> var. <i>calva</i>	G5T1	x			
V	<i>Silene seelyi</i>	G1G2	x			
V	<i>Silene spaldingii</i>	G2	x	x	x	x
V	<i>Sisyrinchium sarmentosum</i>	G2	x			
V	<i>Sisyrinchium septentrionale</i>	G3G4	x			
V	<i>Spiranthes diluvialis</i>	G2	x			x
V	<i>Stanleya confertiflora</i>	G1		x		x
V	<i>Stephanomeria malheurensis</i>	G1		x		



**Table 4. Plants with a Natural Heritage Rank of G1-G3 (and/or T1-T3) Included in Evaluation of Alternatives. (continued)**

Taxa	Species	Rank <sup>1</sup>	WA	OR	MT	ID
V	<i>Sullivantia hapemanii</i>	G3				x
V	<i>Sullivantia hapemanii</i> var. <i>hapemanii</i>	G3T3				x
V	<i>Synthyris platycarpa</i>	G3				x
V	<i>Talinum sediforme</i>	G2G3	x			
V	<i>Tauschia hooveri</i>	G2	x			
V	<i>Tauschia tenuissima</i>	G3	x			x
V	<i>Thelypodium brachycarpum</i>	G3		x		
V	<i>Thelypodium eucosmum</i>	G2		x		
V	<i>Thelypodium howellii</i> spp. <i>howellii</i>	G2?T1?		x		
V	<i>Thelypodium howellii</i> spp. <i>spectabilis</i>	G2?T1		x		
V	<i>Thelypodium paniculatum</i>	G2G3				x
V	<i>Thelypodium repandum</i>	G3				x
V	<i>Thlaspi idahoense</i> var. <i>aileeniae</i>	G4T3				x
V	<i>Thlaspi parviflorum</i>	G3			x	
V	<i>Trifolium douglasii</i>	G3G4	x	x		
V	<i>Trifolium eriocephalum</i> spp. <i>arcuatum</i>	G4T3?			x	
V	<i>Trifolium leibergii</i>	G2		x		
V	<i>Trifolium owyheense</i>	G2G3		x		x
V	<i>Trifolium plumosum</i> var. <i>amplifolium</i>	G4T2				x
V	<i>Trifolium thompsonii</i>	G2	x			
V	<i>Veratrum insolitum</i>	G3	x			
V	<i>Waldsteinia idahoensis</i>	G3			x	x

<sup>1</sup> The network of Natural Heritage Programs and Conservation Data Centers — which currently consists of installations in all 50 states, several Canadian provinces, and several Latin American and Caribbean countries — ranks the rangewide (GRANK or global rank) and state (SRANK or state rank) status of plants, animals, and plant communities on a scale of 1 to 5. The rank is primarily based on the number of known occurrences, but other factors such as habitat quality, estimated number of individuals, narrowness of range of habitat, trends in populations and habitat, threats to the element, and other factors are also considered. The ranking system is meant to exist alongside national and state rare species lists because these lists often include additional criteria (for example, recovery potential, depth of knowledge) that go beyond assessing threats to extinction.

#### COMPONENTS OF RANKS:

**G** = Global rank indicator; denotes rank based on rangewide status.

**T** = Trinomial rank indicator; denotes rangewide status of intraspecific taxa.

**S** = State rank indicator; denotes rank based on status within a particular state.

**1** = Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).

**2** = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences).

**3** = Rare or uncommon but not imperiled (typically 21 to 100 occurrences).

**4** = Not rare and apparently secure, but with cause for long-term concern (usually more than 100 occurrences).

**5** = Demonstrably widespread, abundant, and secure.

**Q** = Indicates uncertainty about taxonomic status.

**?** = Not yet ranked.

Example: **G4T2** = species is apparently secure rangewide, but this particular subspecies or variety is imperiled.



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives.**

Common name	Scientific name	Evaluation <sup>1</sup>
<b>Amphibians</b>		
Cascade torrent salamander	<i>Rhyacotriton cascadae</i>	no
Cope's giant salamander	<i>Dicamptodon copei</i>	no
Long-toed salamander	<i>Ambystoma macrodactylum</i>	no
Northwestern salamander	<i>Ambystoma gracile</i>	no
Tiger salamander	<i>Ambystoma tigrinum</i>	no
Dunn's salamander	<i>Plethodon dunni</i>	no
Ensatina	<i>Ensatina eschscholtzii</i>	no
Oregon slender salamander	<i>Batrachoseps wrighti</i>	no
Rough-skin newt	<i>Taricha granulosa</i>	no
Pacific chorus frog	<i>Pseudacris regilla</i>	no
Western chorus frog	<i>Pseudacris triseriata</i>	no
Great basin spadefoot	<i>Spea intermontana</i>	no
Bullfrog	<i>Rana catesbeiana</i>	no
Cascades frog	<i>Rana cascadae</i>	no
Foothill yellow-legged frog	<i>Rana boylei</i>	no
Green frog	<i>Rana clamitans</i>	no
Red-legged frog	<i>Rana aurora</i>	no
Wood frog	<i>Rana sylvatica</i>	Fine
<b>Birds</b>		
Pacific loon	<i>Gavia pacifica</i>	no
Red-throated loon	<i>Gavia stellata</i>	no
Yellow-billed loon	<i>Gavia adamsii</i>	no
Eared grebe	<i>Podiceps nigricollis</i>	no
Horned grebe	<i>Podiceps auritus</i>	no
Pied-billed grebe	<i>Podilymbus podiceps</i>	no
Double-crested cormorant	<i>Phalacrocorax auritus</i>	no
Cattle egret	<i>Bubulcus ibis</i>	no
Green heron	<i>Butorides virescens</i>	no
American black duck	<i>Anas rubripes</i>	no
Black scoter	<i>Melanitta nigra</i>	no
Brant	<i>Branta bernicla</i>	no
Canada goose	<i>Branta canadensis</i>	no
Eurasian wigeon	<i>Anas penelope</i>	no
Greater scaup	<i>Aythya marila</i>	no
Greater white-fronted goose	<i>Anser albifrons</i>	no
Mute swan	<i>Cygnus olor</i>	no
Oldsquaw	<i>Clangula hyemalis</i>	no
Red-breasted merganser	<i>Mergus serrator</i>	no
Ross' goose	<i>Chen rossii</i>	no
Snow goose	<i>Chen caerulescens</i>	no
Surf scoter	<i>Melanitta perspicillata</i>	no
Tundra swan	<i>Cygnus columbianus</i>	no
White-winged scoter	<i>Melanitta fusca</i>	no
Turkey vulture	<i>Cathartes aura</i>	no
Black-shouldered kite	<i>Elanus caeruleus</i>	no
Cooper's hawk	<i>Accipiter cooperii</i>	no
Golden eagle	<i>Aquila chrysaetos</i>	no
Northern harrier	<i>Circus cyaneus</i>	no
Osprey	<i>Pandion haliaetus</i>	no
Red-shouldered hawk	<i>Buteo lineatus</i>	no
Red-tailed hawk	<i>Buteo jamaicensis</i>	no
Rough-legged hawk	<i>Buteo lagopus</i>	no
Sharp-shinned hawk	<i>Accipiter striatus</i>	no
Swainson's hawk	<i>Buteo swainsoni</i>	no
American kestrel	<i>Falco sparverius</i>	no
Gyr Falcon	<i>Falco rusticolus</i>	no



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)**

Common name	Scientific name	Evaluation <sup>1</sup>
Merlin	<i>Falco columbarius</i>	no
Peregrine falcon	<i>Falco peregrinus</i>	no
Prairie falcon	<i>Falco mexicanus</i>	no
California quail	<i>Callipepla californica</i>	no
Chukar	<i>Alectoris chukar</i>	no
Gambel's quail	<i>Callipepla gambelii</i>	no
Gray partridge	<i>Perdix perdix</i>	no
Northern bobwhite	<i>Colinus virginianus</i>	no
Ring-necked pheasant	<i>Phasianus colchicus</i>	no
Ruffed grouse	<i>Bonasa umbellus</i>	no
Scaled quail	<i>Callipepla squamata</i>	no
Spruce grouse	<i>Dendragapus canadensis</i>	no
White-tailed ptarmigan	<i>Lagopus leucurus</i>	no
Wild turkey	<i>Meleagris gallopavo</i>	no
American coot	<i>Fulica americana</i>	no
Whooping crane	<i>Grus americana</i>	no
American golden-plover	<i>Pluvialis dominica</i>	no
Black-bellied plover	<i>Pluvialis squatarola</i>	no
Killdeer	<i>Charadrius vociferus</i>	no
Mountain plover	<i>Charadrius montanus</i>	no
Semipalmated plover	<i>Charadrius semipalmatus</i>	no
Baird's sandpiper	<i>Calidris bairdii</i>	no
Dunlin	<i>Calidris alpina</i>	no
Greater yellowlegs	<i>Tringa melanoleuca</i>	no
Hudsonian godwit	<i>Limosa haemastica</i>	no
Least sandpiper	<i>Calidris minutilla</i>	no
Lesser yellowlegs	<i>Tringa flavipes</i>	no
Long-billed curlew	<i>Numenius americanus</i>	no
Marbled godwit	<i>Limosa fedoa</i>	no
Pectoral sandpiper	<i>Calidris melanotos</i>	no
Red knot	<i>Calidris canutus</i>	no
Red phalarope	<i>Phalaropus fulicaria</i>	no
Red-necked phalarope	<i>Phalaropus lobatus</i>	no
Sanderling	<i>Calidris alba</i>	no
Semipalmated sandpiper	<i>Calidris pusilla</i>	no
Short-billed dowitcher	<i>Limnodromus griseus</i>	no
Solitary sandpiper	<i>Tringa solitaria</i>	no
Stilt sandpiper	<i>Calidris himantopus</i>	no
Western sandpiper	<i>Calidris mauri</i>	no
Whimbrel	<i>Numenius phaeopus</i>	no
White-rumped sandpiper	<i>Calidris fuscicollis</i>	no
Bonaparte's gull	<i>Larus philadelphia</i>	no
California gull	<i>Larus californicus</i>	no
Caspian tern	<i>Sterna caspia</i>	Fine
Common tern	<i>Sterna hirundo</i>	no
Franklin's gull	<i>Larus pipixcan</i>	no
Glaucous gull	<i>Larus hyperboreus</i>	no
Glaucous-winged gull	<i>Larus glaucescens</i>	no
Herring gull	<i>Larus argentatus</i>	no
Long-tailed jaeger	<i>Stercorarius longicaudus</i>	no
Mew gull	<i>Larus canus</i>	no
Parasitic jaeger	<i>Stercorarius parasiticus</i>	no
Ring-billed gull	<i>Larus delawarensis</i>	no
Sabine's gull	<i>Xema sabini</i>	no
Thayer's gull	<i>Larus thayeri</i>	no
Ancient murrelet	<i>Synthliboramphus antiquus</i>	no
Marbled murrelet	<i>Brachyramphus marmoratus</i>	no
Band-tailed pigeon	<i>Columba fasciata</i>	no



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)**

Common name	Scientific name	Evaluation <sup>1</sup>
Mourning dove	<i>Zenaida macroura</i>	no
Rock dove	<i>Columba livia</i>	no
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	no
Common barn owl	<i>Tyto alba</i>	no
Barred owl	<i>Strix varia</i>	no
Great horned owl	<i>Bubo virginianus</i>	no
Northern hawk owl	<i>Surnia ulula</i>	no
Northern pygmy-owl	<i>Glaucidium gnoma</i>	no
Northern saw-whet owl	<i>Aegolius acadicus</i>	no
Northern spotted owl	<i>Strix occidentalis caurina</i>	no
Snowy owl	<i>Nyctea scandiaca</i>	no
Common nighthawk	<i>Chordeiles minor</i>	no
Common poorwill	<i>Phalaenoptilus nuttallii</i>	no
Whip-poor-will	<i>Caprimulgus vociferus</i>	no
Black swift	<i>Cypseloides niger</i>	no
White-throated swift	<i>Aeronautes saxatalis</i>	no
Anna's hummingbird	<i>Calypte anna</i>	no
Calliope hummingbird	<i>Stellula calliope</i>	no
Costa's humminmgbird	<i>Calypte costae</i>	no
Belted kingfisher	<i>Ceryle alcyon</i>	no
Hairy woodpecker	<i>Picoides villosus</i>	no
Northern flicker	<i>Colaptes auratus</i>	no
Red-breasted sapsucker	<i>Sphyrapicus ruber</i>	Fine
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	no
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Fine
Acorn woodpecker	<i>Melanerpes formicivorus</i>	no
Alder flycatcher	<i>Empidonax alnorum</i>	no
Cordilleran flycatcher	<i>Empidonax occidentalis</i>	no
Dusky flycatcher	<i>Empidonax oberholseri</i>	no
Eastern kingbird	<i>Tyrannus tyrannus</i>	no
Gray flycatcher	<i>Empidonax wrightii</i>	no
Say's phoebe	<i>Sayornis saya</i>	no
Scissor-tailed flycatcher	<i>Tyrannus forficatus</i>	no
Western kingbird	<i>Tyrannus verticalis</i>	no
Western wood-pewee	<i>Contopus sordidulus</i>	no
Horned lark	<i>Eremophila alpestris</i>	no
Bank swallow	<i>Riparia riparia</i>	no
Barn swallow	<i>Hirundo rustica</i>	no
Cliff swallow	<i>Hirundo pyrrhonota</i>	no
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	no
Purple martin	<i>Progne subis</i>	no
Tree swallow	<i>Tachycineta bicolor</i>	no
Violet-green swallow	<i>Tachycineta thalassina</i>	no
American crow	<i>Corvus brachyrhynchos</i>	no
Black-billed magpie	<i>Pica pica</i>	no
Blue jay	<i>Cyanocitta cristata</i>	no
Clark's nutcracker	<i>Nucifraga columbiana</i>	no
Common raven	<i>Corvus corax</i>	no
Gray jay	<i>Perisoreus canadensis</i>	no
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	no
Scrub jay	<i>Aphelocoma coerulescens</i>	no
Steller's jay	<i>Cyanocitta stelleri</i>	no
Black-capped chickadee	<i>Parus atricapillus</i>	no
Boreal chickadee	<i>Parus hudsonicus</i>	no
Mountain chickadee	<i>Parus gambeli</i>	no
Plain titmouse	<i>Parus inornatus</i>	no
Red-breasted nuthatch	<i>Sitta canadensis</i>	no
Bewick's wren	<i>Thryomanes bewickii</i>	no



Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)

Common name	Scientific name	Evaluation <sup>1</sup>
Canyon wren	<i>Catherpes mexicanus</i>	no
House wren	<i>Troglodytes aedon</i>	no
Marsh wren	<i>Cistothorus palustris</i>	no
Rock wren	<i>Salpinctes obsoletus</i>	no
American dipper	<i>Cinclus mexicanus</i>	no
American robin	<i>Turdus migratorius</i>	no
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	no
Hermit thrush	<i>Catharus guttatus</i>	no
Mountain bluebird	<i>Sialia currucoides</i>	no
Ruby-crowned kinglet	<i>Regulus calendula</i>	no
Swainson's thrush	<i>Catharus ustulatus</i>	no
Townsend's solitaire	<i>Myadestes townsendi</i>	no
Wrentit	<i>Chamaea fasciata</i>	no
Brown thrasher	<i>Toxostoma rufum</i>	no
Gray catbird	<i>Dumetella carolinensis</i>	no
Northern mockingbird	<i>Mimus polyglottos</i>	no
American pipit	<i>Anthus rubescens</i>	no
Sprague's pipit	<i>Anthus spragueii</i>	no
Bohemian waxwing	<i>Bombycilla garrulus</i>	no
Cedar waxwing	<i>Bombycilla cedrorum</i>	no
Phainopepla	<i>Phainopepla nitens</i>	no
Northern shrike	<i>Lanius excubitor</i>	no
European starling	<i>Sturnus vulgaris</i>	no
Solitary vireo	<i>Vireo solitarius</i>	no
Warbling vireo	<i>Vireo gilvus</i>	no
American tree sparrow	<i>Spizella arborea</i>	no
Baird's sparrow	<i>Ammodramus bairdii</i>	no
Bay-breasted warbler	<i>Dendroica castanea</i>	no
Black-and-white warbler	<i>Mniotilta varia</i>	no
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>	no
Black-throated blue warbler	<i>Dendroica caerulescens</i>	no
Black-throated gray warbler	<i>Dendroica nigrescens</i>	no
Blackburnian warbler	<i>Dendroica fusca</i>	no
Blackpoll warbler	<i>Dendroica striata</i>	no
Blue grosbeak	<i>Guiraca caerulea</i>	no
California towhee	<i>Pipilo crissalis</i>	no
Chestnut-collared longspur	<i>Calcarius ornatus</i>	no
Chestnut-sided warbler	<i>Dendroica pensylvanica</i>	no
Chipping sparrow	<i>Spizella passerina</i>	no
Common grackle	<i>Quiscalus quiscula</i>	no
Common yellowthroat	<i>Geothlypis trichas</i>	no
Dark-eyed junco	<i>Junco hyemalis</i>	no
Dickcissel	<i>Spiza americana</i>	no
Golden-crowned sparrow	<i>Zonotrichia atricapilla</i>	no
Great-tailed grackle	<i>Quiscalus mexicanus</i>	no
Green-tailed towhee	<i>Pipilo chlorurus</i>	no
Harris' sparrow	<i>Zonotrichia querula</i>	no
House sparrow	<i>Passer domesticus</i>	no
Indigo bunting	<i>Passerina cyanea</i>	no
Lapland longspur	<i>Calcarius lapponicus</i>	no
Le conte's sparrow	<i>Ammodramus leconteii</i>	no
Lincoln's sparrow	<i>Melospiza lincolnii</i>	no
Macgillivray's warbler	<i>Oporornis tolmiei</i>	no
Magnolia warbler	<i>Dendroica magnolia</i>	no
Mccown's longspur	<i>Calcarius mccownii</i>	no
Nashville warbler	<i>Vermivora ruficapilla</i>	no
Northern oriole	<i>Icterus galbula</i>	no
Northern parula	<i>Parula americana</i>	no



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)**

Common name	Scientific name	Evaluation <sup>1</sup>
Northern waterthrush	<i>Seiurus noveboracensis</i>	no
Orange-crowned warbler	<i>Vermivora celata</i>	no
Ovenbird	<i>Seiurus aurocapillus</i>	no
Painted redstart	<i>Myioborus pictus</i>	no
Palm warbler	<i>Dendroica palmarum</i>	no
Red-winged blackbird	<i>Agelaius phoeniceus</i>	no
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	no
Rufous-sided towhee	<i>Pipilo erythrophthalmus</i>	no
Rusty blackbird	<i>Euphagus carolinus</i>	no
Scarlet tanager	<i>Piranga olivacea</i>	no
Scott's oriole	<i>Icterus parisorum</i>	no
Snow bunting	<i>Plectrophenax nivalis</i>	no
Song sparrow	<i>Melospiza melodia</i>	no
Summer tanager	<i>Piranga rubra</i>	no
Swamp sparrow	<i>Melospiza georgiana</i>	no
Tennessee warbler	<i>Vermivora peregrina</i>	no
Townsend's warbler	<i>Dendroica townsendi</i>	no
Western tanager	<i>Piranga ludoviciana</i>	no
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	no
White-throated sparrow	<i>Zonotrichia albicollis</i>	no
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>	no
Yellow-rumped warbler	<i>Dendroica coronata</i>	no
American goldfinch	<i>Carduelis tristis</i>	no
Cassin's finch	<i>Carpodacus cassinii</i>	no
Common redpoll	<i>Carduelis flammea</i>	no
Evening grosbeak	<i>Coccothraustes vespertinus</i>	no
Hoary redpoll	<i>Carduelis hornemanni</i>	no
House finch	<i>Carpodacus mexicanus</i>	no
Lesser goldfinch	<i>Carduelis psaltria</i>	no
Pine grosbeak	<i>Pinicola enucleator</i>	no
Purple finch	<i>Carpodacus purpureus</i>	no
Red crossbill	<i>Loxia curvirostra</i>	no
Savannah sparrow	<i>Passerculus sandwichensis</i>	no
<b>Mammals</b>		
Virginia opossum	<i>Didelphis virginiana</i>	no
Masked shrew	<i>Sorex cinereus</i>	no
Merriam's shrew	<i>Sorex merriami</i>	no
Montane shrew	<i>Sorex monticolus</i>	no
Trowbridge's shrew	<i>Sorex trowbridgii</i>	no
Vagrant shrew	<i>Sorex vagrans</i>	no
Broad-footed mole	<i>Scapanus latimanus</i>	Fine
Coast mole	<i>Scapanus orarius</i>	no
Shrew-mole	<i>Neurotrichus gibbsii</i>	Fine
Big brown bat	<i>Eptesicus fuscus</i>	no
California myotis	<i>Myotis californicus</i>	no
Little brown myotis	<i>Myotis lucifugus</i>	no
Western pipistrelle	<i>Pipistrellus hesperus</i>	no
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	Fine
American pika	<i>Ochotona princeps</i>	no
Black-tailed jackrabbit	<i>Lepus californicus</i>	no
Eastern cottontail	<i>Sylvilagus floridanus</i>	no
Mountain cottontail	<i>Sylvilagus nuttallii</i>	no
Snowshoe hare	<i>Lepus americanus</i>	no
White-tailed jackrabbit	<i>Lepus townsendii</i>	no
Mountain beaver	<i>Aplodontia rufa</i>	Fine
Belding's ground squirrel	<i>Spermophilus beldingi</i>	no
California ground squirrel	<i>Spermophilus beecheyi</i>	no



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)**

Common name	Scientific name	Evaluation <sup>1</sup>
Cascade golden-mantled ground squirrel	<i>Spermophilus saturatus</i>	no
Cliff chipmunk	<i>Tamias dorsalis</i>	Fine
Columbian ground squirrel	<i>Spermophilus columbianus</i>	no
Douglas' squirrel	<i>Tamiasciurus douglasii</i>	no
Eastern fox squirrel	<i>Sciurus niger</i>	no
Golden-mantled ground squirrel	<i>Spermophilus lateralis</i>	no
Hoary marmot	<i>Marmota caligata</i>	no
Least chipmunk	<i>Tamias minimus</i>	no
Red squirrel	<i>Tamiasciurus hudsonicus</i>	no
Red-tailed chipmunk	<i>Tamias ruficaudus</i>	no
Townsend's ground squirrel	<i>Spermophilus townsendii</i>	no
Uinta chipmunk	<i>Tamias umbrinus</i>	Fine
Yellow-bellied marmot	<i>Marmota flaviventris</i>	no
Yellow-pine chipmunk	<i>Tamias amoenus</i>	no
Botta's pocket gopher	<i>Thomomys bottae</i>	Fine
Brushprairie pocket gopher	<i>Thomomys talpoides douglasi</i>	Fine
Northern pocket gopher	<i>Thomomys talpoides</i>	no
Townsend's pocket gopher	<i>Thomomys townsendii</i>	no
Western pocket gopher	<i>Thomomys mazama</i>	no
White salmon pocket gopher	<i>Thomomys talpoides limosus</i>	Fine
California kangaroo rat	<i>Dipodomys californicus</i>	no
Chisel-toothed kangaroo rat	<i>Dipodomys microps</i>	no
Dark kangaroo mouse	<i>Microdipodops megacephalus</i>	no
Great basin pocket mouse	<i>Perognathus parvus</i>	no
Little pocket mouse	<i>Perognathus longimembris</i>	no
Ord's kangaroo rat	<i>Dipodomys ordii</i>	no
Beaver	<i>Castor canadensis</i>	no
Black rat	<i>Rattus rattus</i>	no
Bushy-tailed woodrat	<i>Neotoma cinerea</i>	no
Canyon mouse	<i>Peromyscus crinitus</i>	no
Columbian mouse	<i>Peromyscus keenii</i>	no
Common muskrat	<i>Ondatra zibethicus</i>	no
Creeping vole	<i>Microtus oregoni</i>	no
Deer mouse	<i>Peromyscus maniculatus</i>	no
Desert woodrat	<i>Neotoma lepida</i>	no
Dusky-footed woodrat	<i>Neotoma fuscipes</i>	Fine
Heather vole	<i>Phenacomys intermedius</i>	no
House mouse	<i>Mus musculus</i>	no
Long-tailed vole	<i>Microtus longicaudus</i>	no
Meadow vole	<i>Microtus pennsylvanicus</i>	no
Montane vole	<i>Microtus montanus</i>	no
Northern grasshopper mouse	<i>Onychomys leucogaster</i>	no
Norway rat	<i>Rattus norvegicus</i>	no
Pinyon mouse	<i>Peromyscus truei</i>	Fine
Potholes meadow vole	<i>Microtus pennsylvanicus kincaidi</i>	Fine
Southern red-backed vole	<i>Clethrionomys gapperi</i>	no
Western harvest mouse	<i>Reithrodontomys megalotis</i>	no
Western red-backed vole	<i>Clethrionomys californicus</i>	no
Pacific jumping mouse	<i>Zapus trinotatus</i>	Fine
Western jumping mouse	<i>Zapus princeps</i>	no
Common porcupine	<i>Erethizon dorsatum</i>	no
Nutria	<i>Myocastor coypus</i>	no
Common gray fox	<i>Urocyon cinereoargenteus</i>	Fine
Coyote	<i>Canis latrans</i>	no
Red fox	<i>Vulpes vulpes</i>	no
Black bear	<i>Ursus americanus</i>	no
Common raccoon	<i>Procyon lotor</i>	no
American badger	<i>Taxidea taxus</i>	no



**Table 5. Vertebrates Not Used in the Evaluation of Alternatives. (continued)**

Common name	Scientific name	Evaluation <sup>1</sup>
Ermine	<i>Mustela erminea</i>	no
Long-tailed weasel	<i>Mustela frenata</i>	no
Mink	<i>Mustela vison</i>	no
Northern river otter	<i>Lutra canadensis</i>	no
Striped skunk	<i>Mephitis mephitis</i>	no
Western spotted skunk	<i>Spilogale gracilis</i>	no
Bobcat	<i>Lynx rufus</i>	no
Mountain lion	<i>Felis concolor</i>	no
Feral horse	<i>Equus caballus</i>	no
Black-tailed deer	<i>Odocoileus hemionus columbianus</i>	no
Moose	<i>Alces alces</i>	no
Mule deer	<i>Odocoileus hemionus</i>	no
Rocky mountain elk	<i>Cervus elaphus nelsonii</i>	no
White-tailed deer	<i>Odocoileus virginianus</i>	no
American bison	<i>Bos bison</i>	no
<b>Reptiles</b>		
Northern alligator lizard	<i>Elgaria coerulea</i>	no
Southern alligator lizard	<i>Elgaria multicarinata</i>	no
Desert horned lizard	<i>Phrynosoma platyrhinos</i>	no
Sagebrush lizard	<i>Sceloporus graciosus graciosus</i>	no
Short-horned lizard	<i>Phrynosoma douglassii</i>	no
Side-blotched lizard	<i>Uta stansburiana</i>	no
Western fence lizard	<i>Sceloporus occidentalis</i>	no
Western skink	<i>Eumeces skiltonianus</i>	no
Plateau striped whiptail	<i>Cnemidophorus velox</i>	no
Western whiptail	<i>Cnemidophorus tigris</i>	no
Gopher snake	<i>Pituophis catenifer</i>	no
Night snake	<i>Hypsiglena torquata</i>	no
Racer	<i>Coluber constrictor</i>	no
Ringneck snake	<i>Diadophis punctatus</i>	no
Western terrestrial garter snake	<i>Thamnophis elegans</i>	no
Western rattlesnake	<i>Crotalus viridis</i>	no

<sup>1</sup> Evaluation: "Fine" - recommended for fine-scale analysis by Forests or BLM units based on distribution; "no" - no panel analysis done, and not recommended for fine-scale analysis.

#### Changes in species classification between Draft EISs and Supplemental Draft EIS

##### Species classified as fine-scale by Lehmkuhl et al. (1997) that Wisdom et al. (In Press) classified as broad-scale:

The following species were classified as broad-scale in Wisdom et al. (In Press) because their habitats could be identified based on the 247-acre pixel size: longnose snake, ground snake, California mountain kingsnake, black-throated sparrow, hermit warbler, clay-colored sparrow, Preble's shrew, pygmy shrew, Yuma myotis, Idaho ground squirrel, white-tailed antelope squirrel, Uinta ground squirrel, western gray squirrel, and kit fox-

The classification of the following species was changed because it is ranked as G2 by the Natural Heritage program; Washington ground squirrel

##### Species classified for no additional evaluation by Lehmkuhl et al. (1997) that Wisdom et al. (In Press) classified as broad-scale:

The classification of the following species was changed because of concerns about the habitat or population status among the Source Habitat panelists: short-eared owl, brown creeper, golden-crowned kinglet, varied thrush, lark bunting, pine siskin, pallid bat, Wyoming ground squirrel, sagebrush vole, mountain goat, Rocky Mountain bighorn sheep

The classification of the following species was changed because it had less than 90 probability points in Outcomes 1, 2, and 3 as determined by Lehmkuhl et al. (1997): gray-crowned rosy finch

The classification of the following species was changed because of concerns about the effects on other species among the Source Habitat panelists: brown-headed cowbird



## Appendix 6: Terrestrial and Aquatic Species

### **Species classified for no additional evaluation by Lehmkuhl et al. (1997) that Wisdom et al. (In Press) classified as fine-scale:**

The classification of the following species was changed because of concerns about the habitat or population status among the Source Habitat panelists: American redstart, fox sparrow, Virginia's warbler, and water vole

### **Species classified for broad-scale evaluation by Lehmkuhl et al. (1997) that Wisdom et al. (In Press) classified for no additional evaluation:**

The classification of the following species was changed because they had at least 90 probability points in Outcomes 1, 2, and 3 as determined by Lehmkuhl et al. (1997): Cooper's hawk, Swainson's hawk, northern pygmy-owl, northern saw-whet owl, hairy woodpecker, horned lark, chipping sparrow, green-tailed towhee, red-winged blackbird, rufous-sided towhee, western tanager, white-tailed jackrabbit, desert horned lizard, sagebrush lizard, short-horned lizard, night snake

The classification of the following species was changed by the Source Habitat panelists because it is an invader to the area: barred owl

The classification of the following species was changed because there is limited information on their use of the project area and their range is, in large part, outside the project area: merlin and band-tailed pigeon

### **Species classified for riparian/wetland evaluation by Lehmkuhl et al. (1997) that Wisdom et al. (In Press) classified for no additional evaluation:**

The classification of the following species was changed because they had at least 90 probability points in Outcomes 1, 2, and 3 as determined by Lehmkuhl et al. (1997): black-bellied plover, semipalmated plover, Baird's sandpiper, dunlin, greater yellowlegs, least sandpiper, lesser yellowlegs, long-billed dowitcher, marbled godwit, pectoral sandpiper, red-necked phalarope, sanderling, semipalmated sandpiper, western sandpiper

The classification of the following species was changed because FS/BLM management activities will have little effect on their habitat: California gull and ring-billed gull



**Table 6. Effects of Road-associated Factors on Habitats and Populations of Broad-scale Species of Focus.**

Species	Snag Reduction	Downlog Reduction	Neg.Edge Effects	Over- Hunting	Over- Trapping	Poachin	Collection	Harrassment	Collisions	Movement Barrier	Displacement	Chronic Negative Interactions
1 Pygmy nuthatch	A		B									
1 White-breasted nuthatch	A		B									
1 White-headed woodpecker	A		B									
2 Lewis' woodpecker (migrant population)	A							3				
3 Western gray squirrel			B			60					60	
4 Blue grouse (winter)												
5 Fisher	A	A	B		10, 11				12*		10*	
5 Flammulated owl	A		B									
5 N. goshawk (summer)			B									
5 American marten	A	A	B		4*, 5, 6							
6 Brown creeper	A		B									
6 Chestnut-backed chickadee	A		B									
6 Golden-crowned kinglet			B									
6 Hammond's flycatcher			B									
6 Hoary batA												
6 Pileated woodpecker	A	A	B									
6 Silver-haired bat	A											
6 Vaux's swift	A		B									
6 Varied thrush												
6 Williamson's sapsucker	A		B									
6 Winter wren	A	A	B									
7 Boreal owl	A		B									
8 Great gray owl	A											
9 Black-backed woodpecker	A		B									
10 Olive-sided flycatcher												
11 Three-toed woodpecker	A		B									
11 White-winged crossbill									69*			
12 Woodland caribou			B			13*			13*			



**Table 6. Effects of Road-associated Factors on Habitats and Populations of Broad-scale Species of Focus. (continued)**

Species	Snag Reduction	Downlog Reduction	Neg.Edge Effects	Over- Hunting	Over- Trapping	Poachin	Collection	Harrassment	Collisions	Movement Barrier	Displacement	Chronic Negative Interactions
13 N. Flying squirrel	A	A	B									
14 Hermit warbler			B									
15 Pygmy shrew										C		
15 Wolverine	A			47, 55			68					
16 Lynx		A			31*, 32			33				
17 Blue grouse (summer)								34				
17 Mountain quail								34				
18 Lazuli bunting												
19 Gray wolf			18*	20, 21,		16*, 17, 22, 72	21, 22*, 72		17*, 20*, 19*, 23*,	17, 20,	15*, 18*, 72	16, 19*, 22, 70*, 72
19 Grizzly bear						24, 25, 26, 14*, 72			24*, 26*, 72		14*, 25*, 28*, 29*, 30*, 72*	*24, 14*, 30*, 72
20 Mountain goat				40		C		39, 41	38*		39*	
21 Long-eared owl												
22 Cal. bighorn sheep				C		C		66			C	
22 Rocky Mt. bighorn sheep				65		65		44			42, 43, 57	
23 Broad-tailed hummingbird												
23 Rufous hummingbird												
24 Black-chinned hummingbird												
24 California mt. Kingsnake							35, 67		36*			
24 Sharptail snake		A					67		36*			
25 N. goshawk (winter)												
26 Fringed myotis	A					7, 71		7, 71				
26 Long-eared myotis	A					7, 71		7, 71				
26 Long-legged myotis	A					7, 71		7, 71				
26 Yuma myotis						7, 71		7, 71				
27 Townsend's big-eared bat						7, 8, 71		7, 8, 71			7, 8	
27 Pine siskin									69*			



28	Pallid bat	A							
28	Spotted bat								
28	W. Small-footed myotis			7, 71		7, 71			
29	W. Bluebird	A							
30	Ash-throated flycatcher	A							
30	Bushtit								
31	Burrowing owl			37		48			
31	Ferruginous hawk			73, 74, 75		49, 50	73		
31	Lark sparrow								
31	Pronghorn		27	46	27	9*, 46		45*, 27	
31	Short-eared owl				37, 76, 77	51	76, 77		
31	Vesper sparrow								
31	W. meadowlark								52
32	Ground snake					56, 67	C		
32	Longnose leopard lizard					56, 67	C		
32	Longnose snake					56, 67	C		
32	Mojave black-collared lizard					56, 67	C		
32	Preble's shrew	A						C	
32	Striped whipsnake					56, 67	C		
32	Uinta ground squirrel			C	C				
32	Washington ground squirrel			C	C				
32	White-tailed antelope squirrel			C	C				
32	Wyoming ground squirrel			C	C				
33	Brewer's sparrow								
33	Lark bunting								
33	Pygmy rabbit								
33	Sagebrush vole							C	
33	Sage sparrow								
33	Sage grouse (summer)					C			
33	Sage grouse (winter)								
33	Sage thrasher								
34	Black-throated sparrow								
34	Kit fox				63				
35	Loggerhead shrike						61, 62, 64*		
36	Columbian sharp-tailed grouse (summer)				53, 54		53, 54		



**Table 6. Effects of Road-associated Factors on Habitats and Populations of Broad-scale Species of Focus. (continued)**

Species	Snag Reduction	Downlog Reduction	Neg.Edge Effects	Over- Hunting	Over- Trapping	Poachin	Collection	Harrassment	Collisions	Movement Barrier	Displacement	Chronic Negative Interactions
37 Clay-colored sparrow												
37 Grasshopper sparrow												
37 Idaho ground squirrel						58, 59						
38 Black rosy finch									56			
38 Gray-crowned rosy finch									56			
39 Lewis' woodpecker (resident)	1, 2											
40 Brown-headed cowbird												

A = Species depends on snags, down logs, or both structures to meet life requisites (Thomas and others 1979, volume 3, appendix 1, table 2); consequently, the species presumably is affected by a reduction in density of these structures and the documented linkage of this effect with roads (Hann and others 1997, Quigley and others 1996).

B = Species presumably responds negatively to openings or linear edges created by roads, based on its dependence on closed-canopy habitats and lack of dependence on disturbed or contrasting habitats of openings and closed-canopy forests (such as "habitat-interior" species [Marcot and others 1994]); additional research is needed, however, to validate the presumption.

C = Factor is presumed to have a negative effect on the species, based on documented effects of the factor on species of similar life history or taxa. For poaching or over-hunting of large mammals, documented effects include Cole et al. (1998), Dood and others (1986), Knight and others (1988), McLellan and Shackleton (1988), Mech (1970), Scott and Servheen (1985), Stelfox (1971), Yoakum (1978). For over-harvest and poaching of ground squirrels ("plinking"), effects are described by Ingles (1965). For collisions of reptiles with vehicles, documented effects are summarized by Vestjens (1973) and Bennett (1991). For roads as barriers to movements of small mammals, documented effects are described by Mader (1984), Swihart and Slade (1984), and Merriam (1989). For displacement of all taxa, documented effects are summarized by Bennett (1991). For any other effects on taxa marked with a "C" but not explicitly identified here, documented effects are summarized by Bennett (1991). Presumed effects of factors marked with a "C" require additional research to validate the presumption.

\* = Cited reference makes a direct link with roads as a facilitator of the factor's effect. Cited references not marked by an asterisk establish the factor as a problem for the species but do not address whether roads facilitate the factor's effect.



**Table 6. Effects of Road-associated Factors on Habitats and Populations of Broad-scale Species of Focus. (continued)**

## References:

1. Hann and others 1997;
2. Quigley and others 1996;
3. Bock 1970;
4. Hodgman and others 1994;
5. Fortin and Cantin 1994;
6. Thompson 1994;
7. Nagorsen and Brigham 1993;
8. Idaho State Conservation Effort 1995;
9. Autenrieth 1978;
10. Coulter 1966;
11. Jones 1991;
12. Paragi and others 1994;
13. Scott and Servheen 1985;
14. Mace and others 1996;
15. Thurber and others 1994;
16. Mech 1970;
17. Van Ballenberghe and others 1975;
18. Mladenoff and others 1995;
19. Thiel 1985;
20. Fritts and others 1985;
21. Pletscher and others 1997;
22. Bangs and Fritts 1996;
23. Singer 1979;
24. Knight and others 1988;
25. McLellan and Shackleton 1988;
26. Dood and others 1986;
27. Yoakum 1978;
28. Kasworm and Manley 1990;
29. Mattson and others 1987;
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61. Yosef 1996;
62. Flickinger 1995;
63. DeStefano 1990;
64. Blumton 1989;
65. Stelfox 1971;
66. Taylor and others 1993;
67. Nussbaum and others 1983;
68. Copeland 1996;
69. Ehrlich and others 1988;
70. Mech 1973;
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72. Frederick 1991;
73. Howard 1975;
74. Harmata 1981;
75. Gilmer and others 1985;
76. Clark 1975;
77. Holt 1992.



Table 7. Broadly Distributed Plants.

Taxa	Species	Rank*	Occurrences on Different Administrative Units
N <sup>b</sup>	<i>Dicranella heteromalla</i>	G?	2
N	<i>Texosporium sancti-jacobi</i>	G2	2
V <sup>c</sup>	<i>Adiantum aleuticum</i> subalpine ecotype	G5?T2Q	3
V	<i>Allium madidum</i>	G3	2
V	<i>Allium tolmiei</i> var. <i>persimile</i>	G4T3	3
V	<i>Arabis fecunda</i>	G2	3
V	<i>Arabis sparsiflora</i> var. <i>atrorubens</i>	G5T3	2
V	<i>Artemisia ludoviciana</i> spp. <i>estesii</i>	G5T2	2
V	<i>Astragalus amblytropis</i>	G3	2
V	<i>Astragalus amnis-amissi</i>	G3	2
V	<i>Astragalus aquilonius</i>	G3	2
V	<i>Astragalus arrectus</i>	G2G3	2
V	<i>Astragalus diversifolius</i>	G3	2
V	<i>Astragalus jejunus</i> var. <i>jejunus</i>	G3G4T3?	2
V	<i>Astragalus paysonii</i>	G3	6
V	<i>Astragalus peckii</i>	G3	3
V	<i>Astragalus tegetarioides</i>	G3	3
V	<i>Astragalus vexilliflexus</i> var. <i>nubilus</i>	G4T2	3
V	<i>Bolandra oregana</i>	G3	3
V	<i>Botrychium ascendens</i>	G3	8
V	<i>Botrychium campestre</i>	G3	2
V	<i>Botrychium crenulatum</i>	G3	9
V	<i>Botrychium hesperium</i>	G3	3
V	<i>Botrychium lineare</i>	G1	2
V	<i>Botrychium montanum</i>	G3	13
V	<i>Botrychium paradoxum</i>	G2	10
V	<i>Botrychium pedunculatum</i>	G2?	4
V	<i>Botrychium pumicola</i>	G3	4
V	<i>Calamagrostis tweedyi</i>	G2G3	4
V	<i>Calochortus longebarbatus</i> var. <i>longebarbatus</i>	G3T3	4
V	<i>Calochortus longebarbatus</i> var. <i>peckii</i>	G3T3	2
V	<i>Calochortus macrocarpus</i> var. <i>maculosus</i>	G5T2	4
V	<i>Calochortus nitidus</i>	G3	3
V	<i>Cardamine constancei</i>	G3	4
V		G3?	2
V	<i>Castilleja chlorotica</i>	G3	3
V	<i>Castilleja covilleana</i>	G3G4	2
V	<i>Chaenactis thompsonii</i>	G2G3	2
V	<i>Chrysothamnus parryi</i> spp. <i>montanus</i>	G5T1	2
V	<i>Collomia mazama</i>	G3	3
V	<i>Corydalis caseana</i> spp. <i>hastata</i>	G5T3	5
V	<i>Cymopterus douglassii</i>	G3	2
V	<i>Dasynotus daubenmirei</i>	G3	2
V	<i>Delphinium viridescens</i>	G2	2
V	<i>Douglasia idahoensis</i>	G2	2
V	<i>Draba globosa</i>	G3	5
V	<i>Draba trichocarpa</i>	G1G2	2
V	<i>Erigeron engelmannii</i> var. <i>davisii</i>	G5T2	2
V	<i>Erigeron lackschewitzii</i>	G3Q	3
V	<i>Erigeron salmonensis</i>	G3	2
V	<i>Eriogonum capistratum</i> var. <i>welshii</i>	G4T2	2



Table 7. Broadly Distributed Plants. (continued)

Taxa	Species	Rank*	Occurrences on Different Administrative Units
V	<i>Eriogonum meledonum</i>	G1	2
V	<i>Eriogonum prociduum</i>	G3	2
V	<i>Galium serpticum</i> spp. <i>warnerense</i>	G4G5T2Q	2
V	<i>Grindelia howellii</i>	G3	4
V	<i>Hackelia davisii</i>	G3	4
V	<i>Halimolobos perplexa</i> var. <i>perplexa</i>	G4T3	3
V	<i>Haplopappus hirtus</i> var. <i>sonchifolius</i>	G4G5T3?	2
V	<i>Haplopappus insecticruris</i>	G3	2
V	<i>Haplopappus radiatus</i>	G3	2
V	<i>Howellia aquatilis</i>	G2	2
V	<i>Iliamna longisepala</i>	G3	2
V	<i>Juncus tweedyi</i>	G3	2
V	<i>Lepidium papilliferum</i>	G2	2
V	<i>Leptodactylon pungens</i> spp. <i>hazeliae</i>	G5T1	4
V	<i>Lesquerella carinata</i> var. <i>languida</i>	G3G4T1	2
V	<i>Lesquerella paysonii</i>	G3	5
V	<i>Lomatium geyeri</i>	G3G4	2
V	<i>Lomatium salmoniflorum</i>	G3	2
V	<i>Luina serpentina</i>	G2	2
V	<i>Mimulus patulus</i>	G2Q	3
V	<i>Mirabilis macfarlanei</i>	G2	3
V	<i>Oxytropis besseyi</i> var. <i>salmonensis</i>	G5T3	2
V	<i>Oxytropis campestris</i> var. <i>columbiana</i>	G5T3	2
V	<i>Penstemon barrettiae</i>	G2	3
V	<i>Penstemon glaucinus</i>	G3	3
V	<i>Penstemon idahoensis</i>	G1	2
V	<i>Penstemon lemhiensis</i>	G3	5
V	<i>Penstemon peckii</i>	G3	2
V	<i>Perideridia erythrorhiza</i>	G1	2
V	<i>Phacelia lyallii</i>	G3	4
V	<i>Phacelia minutissima</i>	G3	4
V	<i>Phlox kelseyi</i> var. <i>missoulensis</i>	G2	4
V	<i>Physaria didymocarpa</i> var. <i>lyrata</i>	G5T1	2
V	<i>Physaria integrifolia</i> var. <i>monticola</i>	G3G4T2Q	2
V	<i>Plagiobothrys salsus</i>	G3G4	2
V	<i>Poa abbreviata</i> spp. <i>marshii</i>	G5T1	3
V	<i>Primula wilcoxiana</i>	G3	2
V	<i>Ribes oxyacanthoides</i> spp. <i>irriguum</i>	G5T3T4	2
V	<i>Rorippa columbiae</i>	G3	2
V	<i>Rubus bartonianus</i>	G2	4
V	<i>Saussurea densa</i>	G3G5	2
V	<i>Saxifraga tempestiva</i>	G2	4
V	<i>Scribneria bolanderi</i>	G3G4	2
V	<i>Sidalcea oregana</i> var. <i>calva</i>	G5T1	2
V	<i>Silene seelyi</i>	G1G2	2
V	<i>Silene spaldingii</i>	G2	2
V	<i>Sisyrinchium sarmentosum</i>	G2	2
V	<i>Sisyrinchium septentrionale</i>	G3G4	2
V	<i>Sullivantia hapemanii</i> var. <i>hapemanii</i>	G3T3	2
V	<i>Synthyris platycarpa</i>	G3	2
V	<i>Talinum sediforme</i>	G2G3	3



Table 7. Broadly Distributed Plants. (continued)

Taxa	Species	Rank*	Occurrences on Different Administrative Units
V	<i>Tauschia tenuissima</i>	G3	2
V	<i>Thelypodium brachycarpum</i>	G3	2
V	<i>Thelypodium eucosmum</i>	G2	3
V	<i>Thelypodium repandum</i>	G3	2
V	<i>Thlaspi idahoense</i> var. <i>aileeniae</i>	G4T3	2
V	<i>Thlaspi parviflorum</i>	G3	5
V	<i>Trifolium douglasii</i>	G3G4	2
V	<i>Trifolium eriocephalum</i> spp. <i>arcuatum</i>	G4T3?	2
V	<i>Trifolium leibergii</i>	G2	2
V	<i>Trifolium thompsonii</i>	G2	2
V	<i>Waldsteinia idahoensis</i>	G3	4

\* See Table 4 in this appendix for an explanation of the Rank

<sup>b</sup> N-Nonvascular plant

<sup>c</sup> V-Vascular plant



Table 8. Vascular Plants (G1-G3) and Non-vascular Plants (S1-S3).

Taxa	Scientific Name	WA	OR	MT	ID
N	<i>Aloina bifrons</i>		x		
N	<i>Aspicilia fruticulosa</i>				x
N	<i>Bryoria subdivergens</i>			x	
N	<i>Bryoria tortuosa</i>	x			
N	<i>Bryum calobryoides</i>				x
N	<i>Bryum dichotomum</i>			x	
N	<i>Buxbaumia aphylla</i>				x
N	<i>Buxbaumia piperi</i>				x
N	<i>Calliergon trifarium</i>		x		
N	<i>Catapyrenium congestum</i>				x
N	<i>Cladonia andereggii</i>				x
N	<i>Cladonia imbricarica</i>				x
N	<i>Cladonia luteoalba</i>				x
N	<i>Cladonia transcendens</i>				x
N	<i>Cladonia unicalis</i>				x
N	<i>Cladonia verruculosa</i>				x
N	<i>Collema curtisporum</i>				x
N	<i>Collema furfuraceum</i>				x
N	<i>Dermatocarpon lorenzianum</i>				x
N	<i>Dermatocarpon luridum</i>	x			
N	<i>Desmatodon heimii</i>			x	
N	<i>Dicranella heteromalla</i>			x	
N	<i>Dicranum acutifolium</i>			x	
N	<i>Dicranum fragilifolium</i>			x	
N	<i>Didymodon vinealis</i> var. <i>brachyphyllus</i>			x	
N	<i>Diphasiastrum sitchense</i>				x
N	<i>Eucladium verticillatum</i>			x	
N	<i>Eurhynchium pulchellum</i> var. <i>barnesii</i>			x	
N	<i>Fissidens fontanus</i>			x	
N	<i>Grimmia incurva</i>			x	
N	<i>Grimmia mollis</i>			x	
N	<i>Helodium blandowii</i>				x
N	<i>Heterotheca barbata</i>				x
N	<i>Hookeria lucens</i>				x
N	<i>Hygrohypnum cochlearifolium</i>			x	
N	<i>Hypnum recurvatum</i>			x	
N	<i>Hypogymnia apinnata</i>				x
N	<i>Hypogymnia entermorpha</i>				x
N	<i>Kiaeria blyttii</i>			x	
N	<i>Lobaria hallii</i>				x
N	<i>Lobaria linita</i>				x
N	<i>Lobaria scrobiculata</i>				x
N	<i>Meesia longiseta</i>				x
N	<i>Meesia triquetra</i>			x	
N	<i>Meesia uliginosa</i>			x	
N	<i>Neckera douglasii</i>			x	
N	<i>Oligotrichum aligerum</i>			x	
N	<i>Orthotrichum hallii</i>				x
N	<i>Orthotrichum holzingeri</i>				x
N	<i>Orthotrichum praemorsum</i>			x	
N	<i>Paraleucobryum longifolium</i>			x	
N	<i>Peletolepis quadrata</i>		x		



Table 8. Vascular Plants (G1-G3) and Non-vascular Plants (S1-S3). (continued)

Taxa	Scientific Name	WA	OR	MT	ID
N	<i>Pentagramma iriangularis</i> spp. <i>triangularis</i>				X
N	<i>Phascum cuspidatum</i>			X	
N	<i>Physcia sempinnata</i>				X
N	<i>Physcomitrium pyriforme</i>			X	
N	<i>Pilophorus acicularis</i>				X
N	<i>Porotrichum bigelovii</i>			X	
N	<i>Pseudocrossidium obtusulum</i>			X	
N	<i>Pseudocrossidium anthraspis</i>				X
N	<i>Pterygoneurum subsessile</i>			X	
N	<i>Ramalina thrausta</i>				X
N	<i>Scorpidium scorpioides</i>			X	
N	<i>Sphaerocarpos hians</i>				X
N	<i>Sphaerocarpos globosus</i>				X
N	<i>Sphagnum centrale</i>			X	
N	<i>Sphagnum compactum</i>			X	
N	<i>Sphagnum contortum</i>			X	
N	<i>Sphagnum fimbriatum</i>			X	
N	<i>Sphagnum magellanicum</i>			X	
N	<i>Sphagnum mendocinum</i>			X	
N	<i>Sphagnum riparium</i>			X	
N	<i>Tayloria serrata</i>				X
N	<i>Texosporium sancti-jacobi</i>	X	X		X
N	<i>Thamnia vermicularis</i>				X
N	<i>Thelovva ocellatum</i>				X
N	<i>Tortula bartramii</i>			X	
N	<i>Tortula norvegica</i>			X	
N	<i>Tortula papillosa</i>			X	
N	<i>Triantha occidentalis</i> spp. <i>brevistyla</i>				X
N	<i>Tritomaria exsectiformis</i>		X		
N	<i>Ulota curvifolia</i>				X
N	<i>Ulota megalospora</i>				X
N	<i>Umbilicaria vellea</i>				
N	<i>Usnea sphacelata</i>				
N	<i>xanthoparmelia idahoensis</i>				X
V	<i>Agastache cusickii</i>		X		
V	<i>Allium aaseae</i>				X
V	<i>Allium columbianum</i>			X	
V	<i>Allium constrictum</i>	X			
V	<i>Allium dictuon</i>	X			
V	<i>Allium madidum</i>				X
V	<i>Allium robinsonii</i>		X		
V	<i>Amsinckia carinata</i>		X		
V	<i>Antennaria densifolia</i>			X	
V	<i>Arabis falcifructa</i>				
V	<i>Arabis lasiocarpa</i>				X
V	<i>Astragalus amblytropis</i>				X
V	<i>Astragalus amnis-amissi</i>				X
V	<i>Astragalus applegatei</i>		X		
V	<i>Astragalus aquilonius</i>				X
V	<i>Astragalus arrectus</i>	X			
V	<i>Astragalus camptopus</i>				X
V	<i>Astragalus colubianus</i>	X			



Table 8. Vascular Plants (G1-G3) and Non-vascular Plants (S1-S3). (continued)

Taxa	Scientific Name	WA	OR	MT	ID
V	<i>Astragalus diversifolius</i>				X
V	<i>Astragalus jejunus</i>				X
V	<i>Astragalus jejunus</i> var. <i>jejunus</i>				X
V	<i>Astragalus scaphoides</i>				X
V	<i>Astragalus sinuatus</i>	X			
V	<i>Astragalus tyghensis</i>		X		
V	<i>Bolandra oregana</i>	X			
V	<i>Botrychium pallidum</i>			X	
V	<i>Botrychium pumicola</i>		X		
V	<i>Botrychium spathulatum</i>			X	
V	<i>Calochortus greenei</i>		X		
V	<i>Camissonia palmeri</i>				X
V	<i>Cardamine constancei</i>				X
V	<i>Carex stenoptila</i>			X	
V	<i>Castilleja cervina</i>			X	
V	<i>Castilleja christii</i>				X
V	<i>Castilleja covilleana</i>			X	
V	<i>Castilleja cryptantha</i>	X			
V	<i>Castilleja fraterna</i>		X		
V	<i>Castilleja oresbia</i>				X
V	<i>Castilleja pulchella</i>				X
V	<i>Castilleja rubida</i>		X		
V	<i>Castilleja thompsonii</i>		X		
V	<i>Caulanthus major</i> var. <i>nevadensis</i>		X		
V	<i>Cetraria subalpina</i>				X
V	<i>Chaenactis thompsonii</i>	X			
V	<i>Collomia macrocalyx</i>	X			
V	<i>Collomia mazama</i>		X		
V	<i>Collomia renacta</i>		X		
V	<i>Cryptantha caespitosa</i>				X
V	<i>Cryptantha hypsophila</i>				X
V	<i>Cryptantha salmonensis</i>				X
V	<i>Cymopterus davisii</i>				X
V	<i>Cymopterus douglassii</i>				X
V	<i>Dasynotus daubenmirei</i>				X
V	<i>Delphinium viridescens</i>	X			
V	<i>Draba argyrea</i>				X
V	<i>Draba globosa</i>				X
V	<i>Draba macounii</i>			X	
V	<i>Draba trichocarpa</i>				X
V	<i>Erigeron basalticus</i>	X			
V	<i>Erigeron lackschewitzii</i>			X	
V	<i>Erigeron piperianus</i>	X			
V	<i>Erigeron radicans</i>				X
V	<i>Erigeron salishii</i>	X			
V	<i>Erigeron salmonensis</i>				X
V	<i>Eriogonum chrysops</i>		X		
V	<i>Eriogonum codium</i>	X			
V	<i>Eriogonum crosbyae</i>		X		
V	<i>Eriogonum cusickii</i>		X		
V	<i>Eriogonum desertorum</i>				X
V	<i>Eriogonum lewisii</i>				



Table 8. Vascular Plants (G1-G3) and Non-vascular Plants (S1-S3). (continued)

Taxa	Scientific Name	WA	OR	MT	ID
V	<i>Eriogonum meledonum</i>				X
V	<i>Eriogonum prociduum</i>		X		
V	<i>Eriogonum</i> spp. Nov. (War Eagle Mountain)				X
V	<i>Gratiola heterosepala</i>		X		
V	<i>Hackelia davisii</i>				X
V	<i>Hackelia</i> spp. Nov. (Sleeping Deer Mountain)				X
V	<i>Hackelia venusta</i>	X			
V	<i>Haplopappus insecticruris</i>				X
V	<i>Haplopappus integrifolius</i>				X
V	<i>Hymenoxys lemmonii</i>		X		
V	<i>Iliamna logisepala</i>	X			
V	<i>Ipomopsis minutiflora</i>			X	
V	<i>Ivesia rhypara</i> var. <i>shellyi</i>		X		
V	<i>Ivesia shockleyi</i>		X		
V	<i>Juncus kelloggii</i>	X			
V	<i>Juncus tweedyi</i>				X
V	<i>Juncus uncialis</i>	X			
V	<i>Lathyrus grimesii</i>				
V	<i>Leptodactylon glabrum</i>				X
V	<i>Lesquerella carinata</i> var. <i>languida</i>			X	
V	<i>Lesquerella humilis</i>			X	
V	<i>Lesquerella multiceps</i>				X
V	<i>Lesquerella tuplashensis</i>	X			
V	<i>Lomatium erythrocarpum</i>		X		
V	<i>Lomatium geyeri</i>			X	
V	<i>Lomatium greenmanii</i>		X		
V	<i>Lomatium laevigatum</i>	X			
V	<i>Lomatium ochocense</i>		X		
V	<i>Lomatium packardiae</i>				X
V	<i>Lomatium tuberosum</i>	X			
V	<i>Luina serpentina</i>		X		
V	<i>Mentzelia packardiae</i>		X		
V	<i>Mimulus ampliatus</i>				X
V	<i>Musineon lineare</i>				X
V	<i>Myosurus sessilis</i>		X		
V	<i>Oenthera psammophila</i>				X
V	<i>Orthocarpus bracteosus</i>	X			
V	<i>Papaver radicatum</i> spp. <i>kluanense</i>				X
V	<i>Pedicularis rainerensis</i>	X			
V	<i>Penstemon compactus</i>				X
V	<i>Penstemon idahoensis</i>				X
V	<i>Penstemon peckii</i>		X		
V	<i>Periderdia erythrorhiza</i>		X		
V	<i>Petrophyton cinerascens</i>	X			
V	<i>Phacelia inconspicua</i>				X
V	<i>Phacelia lenta</i>	X			
V	<i>Phavelia lyallii</i>				X
V	<i>Phlox idahonis</i>				X
V	<i>Phlox kelseyi</i> var. <i>missoulensis</i>			X	
V	<i>Physaria integrifolia</i>				X
V	<i>Physaria integrifolia</i> var. <i>monticola</i>				X
V	<i>Plagioblthrys salsus</i>		X		



Table 8. Vascular Plants (G1-G3) and Non-vascular Plants (S1-S3). (continued)

Taxa	Scientific Name	WA	OR	MT	ID
V	<i>Primula alcalina</i>				X
V	<i>Primula brodheadae</i>				X
V	<i>Primula wilcoxiana</i>				X
V	<i>Rubus nigerrimus</i>	X			
V	<i>Salix tweedyi</i>	X			
V	<i>Saussurea densa</i>			X	
V	<i>Saussurea weberi</i>			X	
V	<i>Saxifraga tempestiva</i>			X	
V	<i>Saxifragopsis fragarioides</i>	X			
V	<i>Scirpus rollandii</i>				X
V	<i>Scribneria bolanderi</i>		X		
V	<i>Senecio ertterae</i>		X		
V	<i>Silene seelyi</i>	X			
V	<i>Sisyrinchium sarmentosum</i>	X			
V	<i>Sisyrinchium septentrionale</i>	X			
V	<i>Stephanomeria malheurensis</i>		X		
V	<i>Sullivantia hapemanii</i>				X
V	<i>Sullivantia hapemanii</i> var. <i>hapemanii</i>				X
V	<i>Synthesis platycarpa</i>				X
V	<i>Talinum sediforme</i>	X			
V	<i>Tauschia hooveri</i>	X			
V	<i>Thelypodium brachycarpum</i>		X		
V	<i>Thelypodium eucosmum</i>		X		
V	<i>Thelypodium howellii</i> spp. <i>spectabilis</i>		X		
V	<i>Thelypodium paniculatum</i>				X
V	<i>Thelypodium repandum</i>				X
V	<i>Thlaspi parviflorum</i>			X	
V	<i>Trifolium leibergii</i>		X		
V	<i>Trifolium thompsonii</i>	X			
V	<i>Vertrum insolitum</i>	X			

N = nonvascular

V = vascular







# Appendix 7

## Socio-Economic Information for Counties and Communities

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# Introduction

This appendix provides information on a variety of economic and social attributes of the counties and communities within the Interior Columbia Basin Ecosystem Management Project area covered by this Supplemental Draft Environmental Impact Statement.

A table relating every county and more than 500 communities within the project area to their associated RAC/PAC area and subbasin (by name and number) is provided. This can help the reader connect his or her own local area with the discussions that occur throughout the Supplemental Draft EIS about expected activities, outputs, and effects occurring at the RAC/PAC level, and about restoration focus and activities at the subbasin level.

Basic information is provided at the county level on population, population change during the 1990s, and race/ethnic group components of population; employment and unemployment; per capita income and

poverty rates; federal facts that may affect local area economies (percent federal ownership, federal share of the supply of timber and forage for livestock grazing, and federal revenue-sharing payments as a proportion of county budgets); and measures of economic diversity and socio-economic resiliency.

Additional information is provided for more than 500 communities in the project area, including population figures (where available), degree of isolation from larger towns and trade centers, presence of nearby American Indian reservations, presence of Forest Service or BLM offices, and percent of land within a 20-mile radius that is managed by the agencies.

Finally, the degree of economic specialization in 12 economic sectors is shown for more than 400 communities within the project area. Assessment of the degree of specialization by sector is based on the sector average for the Bureau of Economic Analysis trade area within which a community lies.



**Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area.**

State	County	Town	Subbasin Number/Name	RAC/PAC Name
ID	Ada	Boise	55 / Lower Boise	Lower Snake River RAC
ID	Ada	Eagle	55 / Lower Boise	Lower Snake River RAC
ID	Ada	Garden City	55 / Lower Boise	Lower Snake River RAC
ID	Ada	Kuna	55 / Lower Boise	Lower Snake River RAC
ID	Ada	Meridian	55 / Lower Boise	Lower Snake River RAC
ID	Adams	Council	158 / Weiser	Lower Snake River RAC
ID	Adams	Indian Valley	158 / Weiser	Lower Snake River RAC
ID	Adams	New Meadows	50 / Little Salmon	Upper Columbia-Salmon Clearwater RAC - R4
ID	Bannock	Arimo	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Chubbuck	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Downey	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Fort Hall	2 / American Falls	Upper Snake River RAC
ID	Bannock	Inkom	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Lava Hot Springs	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Mccammon	104 / Portneuf	Upper Snake River RAC
ID	Bannock	Pocatello	104 / Portneuf	Upper Snake River RAC
ID	Benewah	Chatcolet	124 / St. Joe	Upper Columbia-Salmon Clearwater RAC - R1
ID	Benewah	Plummer	124 / St. Joe	Upper Columbia-Salmon Clearwater RAC - R1
ID	Benewah	St. Maries	124 / St. Joe	Upper Columbia-Salmon Clearwater RAC - R1
ID	Benewah	Tensed	36 / Hangman	Upper Columbia-Salmon Clearwater RAC - R1
ID	Bingham	Aberdeen	2 / American Falls	Upper Snake River RAC
ID	Bingham	Basalt	2 / American Falls	Upper Snake River RAC
ID	Bingham	Blackfoot	2 / American Falls	Upper Snake River RAC
ID	Bingham	Firth	2 / American Falls	Upper Snake River RAC
ID	Bingham	Shelley	2 / American Falls	Upper Snake River RAC
ID	Blaine	Bellevue	7 / Big Wood	Upper Snake River RAC
ID	Blaine	Hailey	7 / Big Wood	Upper Snake River RAC
ID	Blaine	Ketchum	7 / Big Wood	Upper Snake River RAC
ID	Blaine	Sun Valley	7 / Big Wood	Upper Snake River RAC
ID	Boise	Banks	96 / North Fork Payette	Lower Snake River RAC
ID	Boise	Crouch	84 / Middle Fork Payette	Lower Snake River RAC
ID	Boise	Garden Valley	84 / Middle Fork Payette	Lower Snake River RAC
ID	Boise	Horseshoe Bend	101 / Payette	Lower Snake River RAC
ID	Boise	Idaho City	12 / Boise-Mores	Lower Snake River RAC
ID	Boise	Placerville	12 / Boise-Mores	Lower Snake River RAC
ID	Bonner	Clark Fork	56 / Lower Clark Fork	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Dover	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	East Hope	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Hope	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Kootenai	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1



Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)

State	County	Town	Subbasin Number/Name	RAC/PAC Name
ID	Bonner	Laclede	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Oldtown	102 / Pend Oreille	Eastern Washington RAC
ID	Bonner	Ponderay	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Priest Lake	106 / Priest	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Priest River	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Samuels	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonner	Sandpoint	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Bonneville	Ammon	39 / Idaho Falls	Upper Snake River RAC
ID	Bonneville	Idaho Falls	39 / Idaho Falls	Upper Snake River RAC
ID	Bonneville	Iona	39 / Idaho Falls	Upper Snake River RAC
ID	Bonneville	Irwin	99 / Palisades	Upper Snake River RAC
ID	Bonneville	Swan Valley	99 / Palisades	Upper Snake River RAC
ID	Bonneville	Ucon	39 / Idaho Falls	Upper Snake River RAC
ID	Boundary	Bonniers Ferry	64 / Lower Kootenai	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Boundary	Moyie Springs	91 / Moyie	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Butte	Arco	6 / Big Lost	Upper Snake River RAC
ID	Butte	Atomic City	2 / American Falls	Upper Snake River RAC
ID	Butte	Butte City	6 / Big Lost	Upper Snake River RAC
ID	Butte	Moore	6 / Big Lost	Upper Snake River RAC
ID	Camas	Fairfield	19 / Camas	Upper Snake River RAC
ID	Canyon	Caldwell	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Greenleaf	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Melba	89 / Middle Snake-Succor	Lower Snake River RAC
ID	Canyon	Middleton	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Nampa	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Notus	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Parma	55 / Lower Boise	Lower Snake River RAC
ID	Canyon	Wilder	55 / Lower Boise	Lower Snake River RAC
ID	Caribou	Bancroft	104 / Portneuf	Upper Snake River RAC
ID	Cassia	Albion	46 / Lake Walcott	Upper Snake River RAC
ID	Cassia	Burley	46 / Lake Walcott	Upper Snake River RAC
ID	Cassia	Declo	46 / Lake Walcott	Upper Snake River RAC
ID	Cassia	Malta	107 / Raft	Upper Snake River RAC
ID	Cassia	Oakley	31 / Goose	Upper Snake River RAC
ID	Clark	Dubois	4 / Beaver-Camas	Upper Snake River RAC
ID	Clark	Spencer	4 / Beaver-Camas	Upper Snake River RAC
ID	Clearwater	Elk River	67 / Lower North Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Clearwater	Hall	67 / Lower North Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Clearwater	Orofino	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1



ID	Clearwater	Pierce	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Clearwater	Weippe	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Custer	Challis	150 / Upper Salmon	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Custer	Clayton	150 / Upper Salmon	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Custer	Lost River	6 / Big Lost	Upper Snake River RAC
ID	Custer	Mackay	6 / Big Lost	Upper Snake River RAC
ID	Custer	Stanley	150 / Upper Salmon	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Elmore	Glenns Ferry	18 / C. J. Strike Reservoir	Lower Snake River RAC
ID	Elmore	Mountain Home	18 / C. J. Strike Reservoir	Lower Snake River RAC
ID	Elmore	Mountain Home Afb	18 / C. J. Strike Reservoir	Lower Snake River RAC
ID	Fremont	Ashton	140 / Upper Henrys	Upper Snake River RAC
ID	Fremont	Drummond	62 / Lower Henrys	Upper Snake River RAC
ID	Fremont	Island Park	140 / Upper Henrys	Upper Snake River RAC
ID	Fremont	Newdale	128 / Teton	Upper Snake River RAC
ID	Fremont	Parker	62 / Lower Henrys	Upper Snake River RAC
ID	Fremont	St. Anthony	62 / Lower Henrys	Upper Snake River RAC
ID	Fremont	Teton	128 / Teton	Upper Snake River RAC
ID	Fremont	Warm River	140 / Upper Henrys	Upper Snake River RAC
ID	Gem	Emmett	101 / Payette	Lower Snake River RAC
ID	Gem	Letha	101 / Payette	Lower Snake River RAC
ID	Gem	Montour	101 / Payette	Lower Snake River RAC
ID	Gem	Ola	101 / Payette	Lower Snake River RAC
ID	Gem	Sweet	101 / Payette	Lower Snake River RAC
ID	Gooding	Bliss	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Gooding	Gooding	52 / Little Wood	Upper Snake River RAC
ID	Gooding	Hagerman	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Gooding	Wendell	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Idaho	Cottonwood	117 / South Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	Elk City	117 / South Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	Ferdinand	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	Grangeville	117 / South Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	Keuterville	69 / Lower Salmon	Upper Columbia-Salmon-Clearwater RAC - R1
D	Idaho	Kooskia	117 / South Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	Riggins	69 / Lower Salmon	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Idaho	Stites	117 / South Fork Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Idaho	White Bird	69 / Lower Salmon	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Jefferson	Hamer	4 / Beaver-Camas	Upper Snake River RAC
ID	Jefferson	Lewisville	39 / Idaho Falls	Upper Snake River RAC
ID	Jefferson	Menan	39 / Idaho Falls	Upper Snake River RAC
ID	Jefferson	Mud Lake	76 / Medicine Lodge	Upper Snake River RAC
ID	Jefferson	Rigby	39 / Idaho Falls	Upper Snake River RAC
ID	Jefferson	Ririe	39 / Idaho Falls	Upper Snake River RAC
ID	Jefferson	Roberts	39 / Idaho Falls	Upper Snake River RAC
ID	Jerome	Eden	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Jerome	Hazelton	152 / Upper Snake-Rock	Upper Snake River RAC



Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)

State	County	Town	Subbasin Number/Name	RAC/PAC Name
ID	Jerome	Jerome	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Kootenai	Athol	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Cataldo	22 / Coeur d'Alene Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Coeur D'alene	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Dalton Gardens	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Fernan Lake Village	22 / Coeur d'Alene Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Harrison	22 / Coeur d'Alene Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Hauser	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Hayden	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Hayden Lake	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Huetter	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Post Falls	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Rathdrum	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Spirit Lake	103 / Pend Oreille Lake	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	State Line	153 / Upper Spokane	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Kootenai	Worley	36 / Hangman	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Bovill	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Deary	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Genesee	100 / Palouse	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Juliaetta	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Kendrick	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Moscow	100 / Palouse	Eastern Washington RAC
ID	Latah	Onaway	100 / Palouse	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Potlatch	100 / Palouse	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Princeton	100 / Palouse	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Latah	Troy	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Lemhi	Carmen	87 / Middle Salmon-Panther	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Ellis	98 / Pahsimeroi	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Gibbonsville	87 / Middle Salmon-Panther	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Leadore	47 / Lemhi	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Lemhi	47 / Lemhi	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	May	98 / Pahsimeroi	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Salmon	87 / Middle Salmon-Panther	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lemhi	Tendoy	47 / Lemhi	Upper Columbia-Salmon-Clearwater RAC - R4
ID	Lewis	Craigmont	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Lewis	Kamiah	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Lewis	Nezperce	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Lewis	Reubens	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Lewis	Winchester	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1



ID	Lincoln	Dietrich	52 / Little Wood	Upper Snake River RAC
ID	Lincoln	Richfield	52 / Little Wood	Upper Snake River RAC
ID	Lincoln	Shoshone	52 / Little Wood	Upper Snake River RAC
ID	Madison	Rexburg	128 / Teton	Upper Snake River RAC
ID	Madison	Sugar City	128 / Teton	Upper Snake River RAC
ID	Minidoka	Acequia	46 / Lake Walcott	Upper Snake River RAC
ID	Minidoka	Heyburn	46 / Lake Walcott	Upper Snake River RAC
ID	Minidoka	Minidoka	46 / Lake Walcott	Upper Snake River RAC
ID	Minidoka	Paul	46 / Lake Walcott	Upper Snake River RAC
ID	Minidoka	Rupert	46 / Lake Walcott	Upper Snake River RAC
ID	Nez Perce	Culdesac	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Nez Perce	Lapwai	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Nez Perce	Lenore	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Nez Perce	Lewiston	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Nez Perce	Peck	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Nez Perce	Spalding	21 / Clearwater	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Owyhee	Grand View	89 / Middle Snake-Succor	Lower Snake River RAC
ID	Owyhee	Homedale	89 / Middle Snake-Succor	Lower Snake River RAC
ID	Owyhee	Marsing	89 / Middle Snake-Succor	Lower Snake River RAC
ID	Payette	Fruitland	101 / Payette	Lower Snake River RAC
ID	Payette	New Plymouth	101 / Payette	Lower Snake River RAC
ID	Payette	Payette	88 / Middle Snake-Payette	Lower Snake River RAC
ID	Power	American Falls	2 / American Falls	Upper Snake River RAC
ID	Power	Arbon Valley	2 / American Falls	Upper Snake River RAC
ID	Power	Rockland	46 / Lake Walcott	Upper Snake River RAC
ID	Shoshone	Kellogg	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Mullan	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Osburn	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Pinehurst	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Silverton	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Smelterville	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Wallace	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Shoshone	Wardner	118 / South Fork Coeur d'Alene	Upper Columbia-Salmon-Clearwater RAC - R1
ID	Teton	Driggs	128 / Teton	Upper Snake River RAC
ID	Teton	Tetonia	128 / Teton	Upper Snake River RAC
ID	Teton	Victor	128 / Teton	Upper Snake River RAC
ID	Twin Falls	Buhl	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Castleford	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Filer	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Hansen	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Hollister	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Kimberly	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Murtaugh	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Twin Falls	Twin Falls	152 / Upper Snake-Rock	Upper Snake River RAC
ID	Valley	Cascade	96 / North Fork Payette	Upper Columbia-Salmon-Clearwater RAC - R4



**Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)**

State	County	Town	Subbasin Number/Name	RAC/PAC Name
ID	Valley	Donnelly	96 / North Fork Payette	Lower Snake River RAC
ID	Valley	Lakefork	96 / North Fork Payette	Lower Snake River RAC
ID	Valley	Mccall	96 / North Fork Payette	Lower Snake River RAC
ID	Valley	Smiths Ferry	96 / North Fork Payette	Lower Snake River RAC
ID	Washington	Cambridge	158 / Weiser	Lower Snake River RAC
ID	Washington	Midvale	158 / Weiser	Lower Snake River RAC
ID	Washington	Weiser	13 / Brownlee Reservoir	Lower Snake River RAC
MT	Deer Lodge	Anaconda	132 / Upper Clark Fork	Butte RAC
MT	Flathead	Columbia Falls	28 / Flathead Lake	Butte RAC
MT	Flathead	Evergreen	125 / Stillwater	Butte RAC
MT	Flathead	Kalispell	28 / Flathead Lake	Butte RAC
MT	Flathead	Olney	125 / Stillwater	Butte RAC
MT	Flathead	Whitefish	125 / Stillwater	Butte RAC
MT	Granite	Drummond	132 / Upper Clark Fork	Butte RAC
MT	Granite	Philipsburg	29 / Flint-Rock	Butte RAC
MT	Lake	Arlee	60 / Lower Flathead	Butte RAC
MT	Lake	Charlo	60 / Lower Flathead	Butte RAC
MT	Lake	Finley Point	28 / Flathead Lake	Butte RAC
MT	Lake	Kicking Horse	60 / Lower Flathead	Butte RAC
MT	Lake	Pablo	60 / Lower Flathead	Butte RAC
MT	Lake	Polson	60 / Lower Flathead	Butte RAC
MT	Lake	Ronan	60 / Lower Flathead	Butte RAC
MT	Lake	St. Ignatius	60 / Lower Flathead	Butte RAC
MT	Lincoln	Eureka	144 / Upper Kootenai	Butte RAC
MT	Lincoln	Fortine	144 / Upper Kootenai	Butte RAC
MT	Lincoln	Libby	144 / Upper Kootenai	Butte RAC
MT	Lincoln	Rexford	144 / Upper Kootenai	Butte RAC
MT	Lincoln	Troy	144 / Upper Kootenai	Butte RAC
MT	Mineral	Alberton	78 / Middle Clark Fork	Butte RAC
MT	Mineral	Saint Regis	78 / Middle Clark Fork	Butte RAC
MT	Mineral	Superior	78 / Middle Clark Fork	Butte RAC
MT	Missoula	Bonner-west Riverside	78 / Middle Clark Fork	Butte RAC
MT	Missoula	Lolo	9 / Bitterroot	Butte RAC
MT	Missoula	Missoula	78 / Middle Clark Fork	Butte RAC
MT	Missoula	Orchard Homes	78 / Middle Clark Fork	Butte RAC
MT	Missoula	Seeley Lake	10-11 / Blackfoot	Butte RAC
MT	Powell	Deer Lodge	132 / Upper Clark Fork	Butte RAC
MT	Ravalli	Darby	9 / Bitterroot	Butte RAC
MT	Ravalli	Hamilton	9 / Bitterroot	Butte RAC



MT	Ravalli	Pinesdale	9 / Bitterroot	Butte RAC
MT	Ravalli	Stevensville	9 / Bitterroot	Butte RAC
MT	Sanders	Hot Springs	60 / Lower Flathead	Butte RAC
MT	Sanders	Noxon	56 / Lower Clark Fork	Butte RAC
MT	Sanders	Plains	56 / Lower Clark Fork	Butte RAC
MT	Sanders	Thompson Falls	56 / Lower Clark Fork	Butte RAC
MT	Sanders	Trout Creek	56 / Lower Clark Fork	Butte RAC
MT	Silver Bow	Butte	132 / Upper Clark Fork	Butte RAC
MT	Silver Bow	Walkerville	132 / Upper Clark Fork	Butte RAC
OR	Baker	Baker City	105 / Powder	John Day-Snake RAC
OR	Baker	Haines	105 / Powder	John Day-Snake RAC
OR	Baker	Halfway	13 / Brownlee Reservoir	John Day-Snake RAC
OR	Baker	Huntington	16 / Burnt	John Day-Snake RAC
OR	Baker	Richland	105 / Powder	John Day-Snake RAC
OR	Baker	Sumpter	105 / Powder	John Day-Snake RAC
OR	Baker	Unity	16 / Burnt	John Day-Snake RAC
OR	Crook	Prineville	58 / Lower Crooked	Deschutes PAC
OR	Deschutes	Bend	138 / Upper Deschutes	Deschutes PAC
OR	Deschutes	Deschutes River Woods	138 / Upper Deschutes	Deschutes PAC
OR	Deschutes	Redmond	138 / Upper Deschutes	Deschutes PAC
OR	Deschutes	Sisters	138 / Upper Deschutes	Deschutes PAC
OR	Deschutes	Terrebonne	58 / Lower Crooked	Deschutes PAC
OR	Deschutes	Three Rivers	138 / Upper Deschutes	Deschutes PAC
OR	Gilliam	Arlington	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
OR	Gilliam	Condon	63 / Lower John Day	John Day-Snake RAC
OR	Gilliam	Lonerock	63 / Lower John Day	John Day-Snake RAC
OR	Grant	Canyon City	141 / Upper John Day	John Day-Snake RAC
OR	Grant	Dayville	141 / Upper John Day	John Day-Snake RAC
OR	Grant	Granite	95 / North Fork John Day	John Day-Snake RAC
OR	Grant	Greenhorn	16 / Burnt	John Day-Snake RAC
OR	Grant	John Day	141 / Upper John Day	John Day-Snake RAC
OR	Grant	Long Creek	141 / Middle Fork John Day	John Day-Snake RAC
OR	Grant	Monument	95 / North Fork John Day	John Day-Snake RAC
OR	Grant	Mount Vernon	141 / Upper John Day	John Day-Snake RAC
OR	Grant	Prairie City	141 / Upper John Day	John Day-Snake RAC
OR	Grant	Seneca	113 / Silvies	Southeastern Oregon RAC
OR	Harney	Burns	113 / Silvies	Southeastern Oregon RAC
OR	Harney	Hines	113 / Silvies	Southeastern Oregon RAC
OR	Jefferson	Culver	58 / Lower Crooked	Deschutes PAC
OR	Jefferson	Madras	59 / Lower Deschutes	Deschutes PAC
OR	Jefferson	Metolius	59 / Lower Deschutes	Deschutes PAC
OR	Jefferson	Warm Springs	59 / Lower Deschutes	Deschutes PAC
OR	Klamath	Altamont	54 / Lost	Klamath PAC
OR	Klamath	Bonanza	54 / Lost	Klamath PAC
OR	Klamath	Chiloquin	160 / Williamson	Klamath PAC



**Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)**

State	County	Town	Subbasin Number/Name	RAC/PAC Name
OR	Klamath	Gilchrist	48 / Little Deschutes	Deschutes PAC
OR	Klamath	Klamath Falls	54 / Lost	Klamath PAC
OR	Klamath	Malin	54 / Lost	Klamath PAC
OR	Klamath	Merrill	54 / Lost	Klamath PAC
OR	Klamath	Modoc Point	160 / Williamson	Klamath PAC
OR	Klamath	Northfork	123 / Sprague	Klamath PAC
OR	Lake	Lakeview	32 / Goose Lake	Southeastern Oregon RAC
OR	Lake	Paisley	44 / Lake Abert	Southeastern Oregon RAC
OR	Malheur	Adrian	89 / Middle Snake-Succor	Lower Snake River RAC
OR	Malheur	Jordan Valley	41 / Jordan	Southeastern Oregon RAC
OR	Malheur	Nyssa	88 / Middle Snake-Payette	Southeastern Oregon RAC
OR	Malheur	Ontario	88 / Middle Snake-Payette	Southeastern Oregon RAC
OR	Malheur	Vale	161-162-163 / Willow	Southeastern Oregon RAC
OR	Morrow	Boardman	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
OR	Morrow	Heppner	161-162-163 / Willow	John Day-Snake RAC
OR	Morrow	Ione	161-162-163 / Willow	John Day-Snake RAC
OR	Morrow	Irrigon	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
OR	Morrow	Lexington	161-162-163 / Willow	John Day-Snake RAC
OR	Sherman	Grass Valley	63 / Lower John Day	John Day-Snake RAC
OR	Sherman	Moro	63 / Lower John Day	John Day-Snake RAC
OR	Sherman	Rufus	79 / Middle Columbia-Hood	John Day-Snake RAC
OR	Sherman	Wasco	79 / Middle Columbia-Hood	John Day-Snake RAC
OR	Umatilla	Adams	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Athena	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Echo	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Helix	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Hermiston	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Milton-freewater	155 / Walla Walla	John Day-Snake RAC
OR	Umatilla	Mission	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Pendleton	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Pilot Rock	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Rieth	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Stanfield	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Ukiah	95 / North Fork John Day	John Day-Snake RAC
OR	Umatilla	Umatilla	131 / Umatilla	John Day-Snake RAC
OR	Umatilla	Weston	155 / Walla Walla	John Day-Snake RAC
OR	Union	Cove	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Union	Elgin	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Union	Imbler	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Union	Island City	139 / Upper Grande Ronde	John Day-Snake RAC



OR	Union	La Grande	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Union	North Powder	105 / Powder	John Day-Snake RAC
OR	Union	Summerville	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Union	Union	139 / Upper Grande Ronde	John Day-Snake RAC
OR	Wallowa	Enterprise	156 / Wallowa	John Day-Snake RAC
OR	Wallowa	Joseph	156 / Wallowa	John Day-Snake RAC
OR	Wallowa	Lostine	156 / Wallowa	John Day-Snake RAC
OR	Wallowa	Wallowa	156 / Wallowa	John Day-Snake RAC
OR	Wasco	Antelope	130 / Trout	Deschutes PAC
OR	Wasco	Chenoweth	79 / Middle Columbia-Hood	Deschutes PAC
OR	Wasco	Dufur	79 / Middle Columbia-Hood	Deschutes PAC
OR	Wasco	Maupin	59 / Lower Deschutes	Deschutes PAC
OR	Wasco	Shaniko	63 / Lower John Day	John Day-Snake RAC
OR	Wasco	The Dalles	79 / Middle Columbia-Hood	Deschutes PAC
OR	Wasco	Tygh Valley	59 / Lower Deschutes	Deschutes PAC
OR	Wheeler	Fossil	63 / Lower John Day	John Day-Snake RAC
OR	Wheeler	Kinzua	63 / Lower John Day	John Day-Snake RAC
OR	Wheeler	Mitchell	63 / Lower John Day	John Day-Snake RAC
OR	Wheeler	Spray	63 / Lower John Day	John Day-Snake RAC
WA	Adams	Hatton	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Adams	Lind	57 / Lower Crab	Eastern Washington RAC
WA	Adams	Othello	57 / Lower Crab	Eastern Washington RAC
WA	Adams	Ritzville	57 / Lower Crab	Eastern Washington RAC
WA	Adams	Washtucna	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Asotin	Asotin	72 / Lower Snake-Asotin	Upper Columbia-Salmon-Clearwater RAC - R1
WA	Asotin	Clarkston	73 / Lower Snake-Tucannon	John Day-Snake RAC
WA	Asotin	Clarkston Heights-vineland	72 / Lower Snake-Asotin	Upper Columbia-Salmon-Clearwater RAC - R1
WA	Asotin	West Clarkston-highland	72 / Lower Snake-Asotin	Upper Columbia-Salmon-Clearwater RAC - R1
WA	Benton	Benton City	75 / Lower Yakima	Yakima PAC
WA	Benton	Finley	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
WA	Benton	Highland	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
WA	Benton	Kennewick	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Benton	Prosser	75 / Lower Yakima	Yakima PAC
WA	Benton	Richland	75 / Lower Yakima	Yakima PAC
WA	Benton	West Richland	75 / Lower Yakima	Yakima PAC
WA	Chelan	Cashmere	159 / Wenatchee	Eastern Washington Cascades PAC
WA	Chelan	Chelan	45 / Lake Chelan	Eastern Washington Cascades PAC
WA	Chelan	Entiat	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Chelan	South Wenatchee	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Chelan	Sunnyslope	159 / Wenatchee	Eastern Washington Cascades PAC
WA	Chelan	Wenatchee	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Chelan	West Wenatchee	159 / Wenatchee	Eastern Washington Cascades PAC
WA	Columbia	Dayton	155 / Walla Walla	John Day-Snake RAC
WA	Columbia	Starbuck	73 / Lower Snake-Tucannon	John Day-Snake RAC
WA	Douglas	Bridgeport	20 / Chief Joseph	Eastern Washington RAC



**Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)**

State	County	Town	Subbasin Number/Name	RAC/PAC Name
WA	Douglas	Coulee Dam	20 / Chief Joseph	Eastern Washington RAC
WA	Douglas	East Wenatchee	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Douglas	East Wenatchee Bench	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Douglas	Mansfield	20 / Chief Joseph	Eastern Washington RAC
WA	Douglas	Rock Island	135 / Upper Columbia-Entiat	Eastern Washington Cascades PAC
WA	Douglas	Waterville	90 / Moses Coulee	Eastern Washington RAC
WA	Ferry	Inchelium	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Ferry	Republic	111 / Sanpoil	Eastern Washington RAC
WA	Franklin	Connell	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Franklin	Kahlotus	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Franklin	Mesa	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Franklin	Pasco	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Franklin	West Pasco	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Garfield	Pomeroy	73 / Lower Snake-Tucannon	John Day-Snake RAC
WA	Grant	Cascade Valley	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Coulee City	3 / Banks Lake	Eastern Washington RAC
WA	Grant	Electric City	3 / Banks Lake	Eastern Washington RAC
WA	Grant	Ephrata	57 / Lower Crab	Eastern Washington RAC
WA	Grant	George	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Grand Coulee	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Grant	Hartline	3 / Banks Lake	Eastern Washington RAC
WA	Grant	Krupp	136 / Upper Crab	Eastern Washington RAC
WA	Grant	Mattawa	135 / Upper Columbia-Priest Rapids	Eastern Washington RAC
WA	Grant	Moses Lake	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Moses Lake North	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Quincy	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Royal City	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Soap Lake	3 / Banks Lake	Eastern Washington RAC
WA	Grant	Warden	57 / Lower Crab	Eastern Washington RAC
WA	Grant	Wilson Creek	136 / Upper Crab	Eastern Washington RAC
WA	Kittitas	Ellensburg	154 / Upper Yakima	Yakima PAC
WA	Kittitas	Kittitas	154 / Upper Yakima	Yakima PAC
WA	Klickitat	Goldendale	43 / Klickitat	Yakima PAC
WA	Lincoln	Almira	136 / Upper Crab	Eastern Washington RAC
WA	Lincoln	Creston	136 / Upper Crab	Eastern Washington RAC
WA	Lincoln	Davenport	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Lincoln	Harrington	136 / Upper Crab	Eastern Washington RAC
WA	Lincoln	Odessa	136 / Upper Crab	Eastern Washington RAC
WA	Lincoln	Reardan	74 / Lower Spokane	Eastern Washington RAC
WA	Lincoln	Sprague	100 / Palouse	Eastern Washington RAC



WA	Lincoln	Wilbur	136 / Upper Crab	Eastern Washington RAC
WA	Okanogan	Brewster	20 / Chief Joseph	Eastern Washington RAC
WA	Okanogan	Conconully	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Elmer City	20 / Chief Joseph	Eastern Washington RAC
WA	Okanogan	Nespelem	20 / Chief Joseph	Eastern Washington RAC
WA	Okanogan	Nespelem Community	20 / Chief Joseph	Eastern Washington RAC
WA	Okanogan	North Omak	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Okanogan	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Omak	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Oroville	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Pateros	20 / Chief Joseph	Eastern Washington RAC
WA	Okanogan	Riverside	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Tonasket	97 / Okanogan	Eastern Washington RAC
WA	Okanogan	Twisp	77 / Methow	Eastern Washington Cascades PAC
WA	Okanogan	Winthrop	77 / Methow	Eastern Washington Cascades PAC
WA	Pend Oreille	Cusick	102 / Pend Oreille	Eastern Washington RAC
WA	Pend Oreille	Ione	102 / Pend Oreille	Eastern Washington RAC
WA	Pend Oreille	Metaline	102 / Pend Oreille	Eastern Washington RAC
WA	Pend Oreille	Metaline Falls	102 / Pend Oreille	Eastern Washington RAC
WA	Pend Oreille	Newport	102 / Pend Oreille	Eastern Washington RAC
WA	Pend Oreille	Usk	102 / Pend Oreille	Eastern Washington RAC
WA	Spokane	Airway Heights	74 / Lower Spokane	Eastern Washington RAC
WA	Spokane	Cheney	36 / Hangman	Eastern Washington RAC
WA	Spokane	Country Homes	51 / Little Spokane	Eastern Washington RAC
WA	Spokane	Deer Park	51 / Little Spokane	Eastern Washington RAC
WA	Spokane	Dishman	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Fairchild Afb	74 / Lower Spokane	Eastern Washington RAC
WA	Spokane	Fairfield	36 / Hangman	Eastern Washington RAC
WA	Spokane	Fairwood	74 / Lower Spokane	Eastern Washington RAC
WA	Spokane	Greenacres	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Latah	36 / Hangman	Eastern Washington RAC
WA	Spokane	Liberty Lake	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Medical Lake	74 / Lower Spokane	Eastern Washington RAC
WA	Spokane	Millwood	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Opportunity	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Otis Orchards-east Farms	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Rockford	36 / Hangman	Eastern Washington RAC
WA	Spokane	Spangle	36 / Hangman	Eastern Washington RAC
WA	Spokane	Spokane	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Town and Country	51 / Little Spokane	Eastern Washington RAC
WA	Spokane	Trentwood	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Veradale	153 / Upper Spokane	Eastern Washington RAC
WA	Spokane	Waverly	36 / Hangman	Eastern Washington RAC
WA	Stevens	Chewelah	23 / Colville	Eastern Washington RAC
WA	Stevens	Colville	23 / Colville	Eastern Washington RAC



**Table 1. Geographic Locations of Counties and Communities in the Interior Columbia Basin Project Area. (continued)**

State	County	Town	Subbasin Number/Name	RAC/PAC Name
WA	Stevens	Kettle Falls	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Stevens	Marcus	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Stevens	Northport	30 / Franklin D. Roosevelt Lake	Eastern Washington RAC
WA	Stevens	Springdale	23 / Colville	Eastern Washington RAC
WA	Walla Walla	Burbank	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
WA	Walla Walla	College Place	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Garrett	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Prescott	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Waitsburg	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Walla Walla	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Walla Walla East	155 / Walla Walla	John Day-Snake RAC
WA	Walla Walla	Wallula	80 / Middle Columbia-Lake Wallula	John Day-Snake RAC
WA	Whitman	Albion	100 / Palouse	Eastern Washington RAC
WA	Whitman	Colfax	100 / Palouse	Eastern Washington RAC
WA	Whitman	Colton	100 / Palouse	Eastern Washington RAC
WA	Whitman	Endicott	100 / Palouse	Eastern Washington RAC
WA	Whitman	Farmington	108 / Rock	Upper Columbia-Salmon-Clearwater RAC - R1
WA	Whitman	Garfield	100 / Palouse	Eastern Washington RAC
WA	Whitman	La Crosse	100 / Palouse	Eastern Washington RAC
WA	Whitman	Lamont	108 / Rock	Eastern Washington RAC
WA	Whitman	Malden	108 / Rock	Eastern Washington RAC
WA	Whitman	Oakesdale	108 / Rock	Eastern Washington RAC
WA	Whitman	Palouse	100 / Palouse	Upper Columbia-Salmon-Clearwater RAC - R1
WA	Whitman	Pullman	100 / Palouse	Eastern Washington RAC
WA	Whitman	Rosalia	108 / Rock	Eastern Washington RAC
WA	Whitman	St. John	108 / Rock	Eastern Washington RAC
WA	Whitman	Tekoa	36 / Hangman	Eastern Washington RAC
WA	Whitman	Uniontown	100 / Palouse	Eastern Washington RAC
WA	Yakima	Fairview-sumach	75 / Lower Yakima	Yakima PAC
WA	Yakima	Fruitvale	92 / Naches	Yakima PAC
TWA	Yakima	Grandview	75 / Lower Yakima	Yakima PAC
WA	Yakima	Granger	75 / Lower Yakima	Yakima PAC
WA	Yakima	Harrah	75 / Lower Yakima	Yakima PAC
WA	Yakima	Mabton	75 / Lower Yakima	Yakima PAC
WA	Yakima	Moxee	75 / Lower Yakima	Yakima PAC
WA	Yakima	Naches	92 / Naches	Yakima PAC
WA	Yakima	Satus	75 / Lower Yakima	Yakima PAC
WA	Yakima	Selah	154 / Upper Yakima	Yakima PAC
WA	Yakima	South Broadway	75 / Lower Yakima	Yakima PAC
WA	Yakima	Sunnyside	75 / Lower Yakima	Yakima PAC



WA	Yakima	Terrace Heights	75 / Lower Yakima	Yakima PAC
WA	Yakima	Tieton	92 / Naches	Yakima PAC
WA	Yakima	Toppenish	75 / Lower Yakima	Yakima PAC
WA	Yakima	Union Gap	75 / Lower Yakima	Yakima PAC
WA	Yakima	Wapato	75 / Lower Yakima	Yakima PAC
WA	Yakima	West Valley	75 / Lower Yakima	Yakima PAC
WA	Yakima	White Swan	75 / Lower Yakima	Yakima PAC
WA	Yakima	Yakima	92 / Naches	Yakima PAC
WA	Yakima	Zillah	75 / Lower Yakima	Yakima PAC

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Table 2. Full- and Part-time Employment<sup>1</sup> for Interior Columbia Basin SDEIS Counties, 1996.

State	County	Total Persons Employed Full- & Part-time	Farm	Agricultural Services, Forestry, & Fishing	Mining	Construc- tion	Manufac- turing	Transprotation, Comm., & Utilities	Wholesale Trade	Retail Trade	Finance, Insur. & Real Estate	Services	Federal Government (Civilian & Military)	State & Local Govt.
(percent by sector)														
ID	Ada	189,571	0.9	1.3	0.2	8.1	12.7	4.3	5.3	17.5	7.6	29.2	3.0	9.9
ID	Adams	1,893	16.5	4.4	(D)	(D)	16.6	3.4	(L)	13.6	3.9	(D)	7.4	13.7
ID	Bannock	38,331	1.9	0.9	0.1	6.6	7.7	5.9	4.4	21.2	5.7	23.9	2.3	19.5
ID	Benewah	4,918	5.1	1.9	1.3	4.5	27.7	6.3	1.8	14.6	2.7	18.6	2.6	13.0
ID	Bingham	18,370	13.0	4.4	0.1	5.5	12.6	3.3	8.4	14.6	2.8	17.5	2.7	14.9
ID	Blaine	15,237	2.5	4.2	0.8	14.9	3.1	2.5	1.9	21.7	9.0	30.8	1.1	7.4
ID	Boise	2,131	5.1	(D)	(L)	7.0	9.7	(D)	(L)	15.3	2.8	30.4	8.1	13.9
ID	Bonner	17,163	3.0	2.4	0.3	9.0	15.1	3.7	2.0	22.9	5.9	22.9	2.4	10.4
ID	Bonneville	47,165	2.9	1.8	0.1	7.6	4.5	3.7	8.4	20.9	4.3	34.1	2.4	9.3
ID	Boundary	4,848	7.5	(D)	(D)	7.6	18.4	4.6	2.3	13.6	3.7	22.6	3.5	13.7
ID	Butte	7,025	4.5	0.6	(L)	(D)	0.5	(D)	0.5	3.6	0.8	82.2	1.0	2.9
ID	Camas	548	21.2	(D)	0.0	6.9	(D)	4.7	2.6	20.1	(L)	16.8	3.5	15.5
ID	Canyon	56,678	5.9	3.7	0.1	7.8	20.1	4.4	3.8	15.8	3.6	24.1	1.4	9.3
ID	Caribou	4,522	13.9	2.0	10.2	6.9	17.2	5.0	3.3	11.7	2.5	12.8	1.7	12.8
ID	Cassia	12,007	13.5	5.8	1.0	4.9	11.4	4.8	4.0	19.2	3.9	18.7	2.2	10.7
ID	Clark	901	45.2	(L)	(L)	(L)	(D)	1.3	(D)	8.2	(D)	4.0	4.3	12.7
ID	Clearwater	4,766	4.6	4.1	(D)	5.3	18.8	3.8	1.1	15.5	3.2	15.4	7.2	20.8
ID	Custer	2,743	13.9	2.5	17.0	5.1	1.2	3.1	2.3	15.7	2.8	19.3	5.9	11.3
ID	Elmore	12,495	6.7	2.2	0.2	3.8	4.2	2.6	1.3	14.6	2.9	12.8	39.1	9.7
ID	Fremont	4,715	21.3	5.5	(L)	6.1	1.7	4.3	4.2	15.0	2.9	16.8	4.7	17.3
ID	Gem	5,414	15.5	3.6	(D)	6.9	12.2	3.9	(D)	15.6	3.7	19.4	3.2	11.9
ID	Gooding	6,819	24.7	6.5	(L)	4.9	6.6	7.2	3.0	12.6	3.1	15.7	1.7	13.9
ID	Idaho	7,260	10.8	2.2	1.5	6.4	13.7	4.7	2.5	14.6	4.4	19.0	7.8	12.4
ID	Jefferson	7,451	17.2	8.2	0.2	9.7	8.7	3.0	6.0	13.9	2.6	14.5	1.8	14.1
ID	Jerome	8,441	20.6	6.8	(L)	5.5	8.2	8.4	7.0	12.9	2.8	16.5	1.6	9.5
ID	Kootenai	52,080	1.2	1.6	0.5	9.9	11.2	3.4	4.0	21.2	6.4	27.1	2.1	11.5
ID	Latah	19,273	3.7	1.7	0.1	4.4	4.7	2.3	2.2	20.2	3.1	24.7	2.5	30.4
ID	Lemhi	4,330	10.9	2.4	(D)	8.1	5.8	3.3	1.3	18.7	3.8	(D)	7.4	12.5
ID	Lewis	2,053	11.7	(D)	(D)	4.4	8.7	4.4	5.7	17.9	5.1	16.4	3.2	17.2
ID	Lincoln	1,843	29.0	4.6	(L)	(D)	(D)	2.3	4.1	7.0	1.7	12.9	6.5	22.7
ID	Madison	12,882	7.1	2.8	(L)	4.0	10.3	2.5	7.2	18.2	3.5	32.7	1.2	10.5
ID	Minidoka	10,955	14.3	7.7	(L)	4.5	17.9	5.2	8.3	10.8	1.9	15.7	1.7	12.1
ID	Nez Perce	25,254	2.0	(D)	(D)	5.6	15.7	5.2	3.6	19.7	6.6	27.4	1.6	10.7
ID	Oneida	1,633	24.7	2.9	(D)	3.1	1.3	1.9	1.5	14.8	(D)	13.5	3.1	21.7
ID	Owyhee	3,775	27.9	9.1	4.5	4.1	3.7	5.2	1.1	11.4	2.2	12.7	3.3	14.9



ID	Payette	8,091	10.6	3.8	0.2	5.0	18.8	5.8	4.4	13.8	4.7	19.6	1.7	11.5
ID	Power	5,197	13.7	3.8	(L)	3.2	36.7	6.5	3.7	8.6	1.7	9.5	1.3	11.4
ID	Shoshone	6,663	0.7	1.0	9.6	6.6	7.0	3.3	1.6	19.3	3.4	26.5	3.2	17.8
ID	Teton	2,262	16.4	3.5	(L)	11.5	4.5	2.1	0.9	18.7	4.4	19.8	2.5	15.6
ID	Twin Falls	37,067	6.3	3.4	0.3	6.4	10.6	5.4	4.7	21.5	4.9	24.0	2.0	10.7
ID	Valley	5,546	2.4	3.3	2.0	11.1	5.1	3.5	1.2	22.1	7.3	22.4	5.9	13.7
ID	Washington	4,579	15.4	7.3	(L)	5.2	10.6	4.1	6.0	13.3	4.1	18.2	2.3	13.5
MT	Deer Lodge	3,950	2.0	0.9	0.6	5.1	3.8	2.2	0.9	19.6	3.8	33.6	3.5	23.9
MT	Flathead	44,553	2.0	1.8	0.4	8.4	11.5	4.3	2.4	21.1	6.7	31.2	2.7	7.4
MT	Granite	1,523	11.9	3.7	(D)	4.5	12.7	3.3	(D)	18.8	4.6	16.6	3.7	15.2
MT	Lake	12,107	9.5	2.4	0.4	7.0	9.0	2.9	1.2	17.6	5.4	32.9	2.3	9.4
MT	Lewis and Clark	36,832	1.4	1.0	0.4	5.4	3.6	3.5	2.5	17.0	7.2	34.1	4.5	19.5
MT	Lincoln	9,013	2.5	3.0	0.5	6.2	17.8	4.3	1.1	18.2	4.5	24.8	7.6	9.5
MT	Mineral	1,699	4.1	2.1	(L)	4.4	13.7	4.1	(L)	25.6	2.6	23.8	5.2	14.2
MT	Missoula	61,436	0.8	1.1	0.2	6.1	6.6	5.9	4.1	21.0	5.9	32.0	2.9	13.3
MT	Powell	3,411	10.7	(D)	(D)	3.8	9.7	3.5	0.6	15.2	4.1	18.8	3.3	26.4
MT	Ravalli	15,248	7.0	2.9	0.3	9.3	10.1	4.2	2.5	17.9	7.4	26.7	4.0	7.7
MT	Sanders	4,437	8.7	2.7	0.6	8.0	9.8	6.1	1.5	15.1	5.1	25.7	4.9	11.9
MT	Silver Bow	18,286	0.6	0.6	3.5	3.9	3.1	7.9	3.5	23.4	4.4	34.3	2.9	11.9
OR	Baker	8,396	11.2	2.6	(D)	(D)	9.5	(D)	2.4	18.4	4.2	24.0	4.8	11.5
OR	Crook	8,419	9.3	2.1	(D)	4.4	20.2	5.1	(D)	13.9	3.6	19.4	5.1	8.6
OR	Deschutes	60,017	2.4	1.7	0.2	9.4	10.0	3.4	2.8	21.2	8.0	30.4	2.0	8.5
OR	Gilliam	1,260	23.9	(D)	(L)	2.1	(D)	23.2	2.8	12.1	3.3	13.9	0.8	14.4
OR	Grant	4,580	12.7	3.0	0.4	4.2	12.6	5.3	1.7	14.2	2.9	17.3	9.4	16.4
OR	Harney	4,083	17.6	3.7	(L)	4.2	9.4	3.3	1.7	16.6	2.9	17.5	6.9	16.1
OR	Hood River	12,434	13.2	3.9	(L)	4.5	10.5	(D)	5.3	18.0	(D)	25.4	1.9	9.5
OR	Jefferson	8,084	8.1	2.0	(D)	2.6	22.7	2.1	4.3	14.9	(D)	23.7	2.7	14.1
OR	Klamath	31,926	6.1	2.4	0.1	5.7	13.7	4.0	4.9	17.5	4.7	25.7	3.4	11.7
OR	Lake	4,233	15.9	(D)	(D)	3.6	11.2	2.9	2.8	15.9	3.0	17.9	8.3	14.6
OR	Malheur	18,256	15.6	5.7	0.5	3.1	8.5	4.5	6.0	18.1	3.0	19.9	1.7	13.4
OR	Morrow	4,804	21.4	(D)	(L)	(D)	19.3	6.3	2.7	7.7	2.2	15.5	2.7	14.1
OR	Sherman	18,256	15.6	5.7	0.5	3.1	8.5	4.5	6.0	18.1	3.0	19.9	13.4	0.0
OR	Umatilla	34,273	9.4	2.9	(L)	4.0	14.1	5.4	3.7	17.4	3.5	24.1	2.8	12.7
OR	Union	14,182	7.8	2.3	0.1	4.0	12.7	5.3	3.5	19.1	3.9	23.1	2.2	15.9
OR	Wallowa	4,489	17.0	4.1	0.0	5.5	9.9	4.3	1.7	15.6	4.3	20.4	3.9	13.3
OR	Wasco	11,544	8.1	(D)	(D)	3.7	10.1	3.2	2.5	24.0	3.8	25.8	2.9	14.3
OR	Wheeler	759	33.9	3.7	0.0	3.6	5.5	1.4	(L)	12.5	3.2	13.3	(L)	20.7
WA	Adams	8,872	21.6	(D)	(L)	(D)	12.9	4.8	7.3	13.7	2.9	13.5	1.3	14.8
WA	Asotin	6,969	3.2	1.7	0.3	8.6	3.9	2.7	2.6	24.0	6.0	34.0	2.1	11.0
WA	Benton	74,512	6.3	3.5	0.1	5.5	6.0	2.9	2.1	17.0	5.1	37.7	1.9	11.8
WA	Chelan	43,447	13.3	4.9	0.2	6.1	6.7	3.0	5.5	17.3	6.0	23.2	2.3	11.6
WA	Columbia	2,176	14.5	2.3	(D)	3.7	17.6	(D)	2.8	11.0	4.7	(D)	3.4	20.9
WA	Douglas	11,019	26.6	(D)	(L)	4.6	1.3	(D)	2.8	17.8	3.7	17.5	2.5	13.6
WA	Ferry	2,856	8.0	3.0	(D)	4.3	11.8	1.8	(L)	14.2	4.2	(D)	6.8	19.3



Table 2. Full- and Part-time Employment<sup>1</sup> for Interior Columbia Basin SDEIS Counties, 1996. (continued)

State	County	Total Persons Employed Full- & Part-time	Farm	Agricultural Services, Forestry, & Fishing	Mining	Construc- tion	Manufac- turing	Transportation, Comm., & Utilities	Wholesale Trade	Retail Trade	Finance, Insur. & Real Estate	Services	Federal Government (Civilian & Military)	State & Local Govt.
(percent by sector)														
WA	Franklin	24,628	17.7	5.6	0.1	5.2	6.2	5.3	6.8	13.3	3.1	20.6	2.6	13.3
WA	Garfield	1,311	22.4	(D)	0.0	3.1	(D)	2.4	10.1	9.2	7.2	10.6	7.9	23.6
WA	Grant	34,907	18.5	5.0	(D)	4.3	12.3	3.5	4.3	15.6	(D)	16.3	1.7	15.0
WA	Kittitas	16,394	8.4	1.9	0.1	4.1	5.8	4.2	2.6	21.2	3.9	21.8	1.9	24.1
WA	Klickitat	8,553	11.1	(D)	0.3	5.3	17.1	6.8	(D)	11.2	4.9	17.5	3.4	16.3
WA	Lincoln	4,955	20.3	2.8	(L)	3.1	2.0	2.5	5.7	13.6	5.0	18.4	2.4	24.3
WA	Okanogan	23,414	20.5	5.3	0.4	3.6	6.3	1.8	5.9	16.5	4.0	19.0	4.3	12.5
WA	Pend Oreille	3,831	6.6	1.6	0.3	7.0	14.0	2.8	0.8	15.3	5.2	19.1	4.2	23.0
WA	Spokane	233,815	1.0	0.9	0.2	6.3	10.0	4.0	5.3	18.1	8.2	31.0	4.4	10.6
WA	Stevens	15,379	8.5	1.7	0.6	5.2	16.7	3.7	1.6	15.5	4.7	25.0	3.7	13.1
WA	Walla Walla	29,384	8.9	3.0	(L)	4.0	13.7	2.5	3.3	15.6	4.7	27.2	4.0	13.2
WA	Whitman	20,447	7.8	1.6	(L)	2.9	1.8	2.5	4.8	15.0	3.7	17.6	2.2	40.2
WA	Yakima	112,482	15.1	3.7	0.0	3.9	9.9	3.3	7.6	15.7	4.0	24.1	2.2	10.4

**Abbreviations used in this Table:**

Comm. - Communications

Insur. - Insurance

(D) = Not shown to avoid disclosure of confidential information. Estimates are included in totals.

(L) = Less than 10 jobs, but the estimates for this sector are included in the totals.

Total full- and part-time employment figures may be greater than the count of total persons employed in the civilian labor force. The former include military personnel and count each job worked.

One person working a full-time day job and a part-time evening job would count as one in the civilian labor force, but would count as two in the employment figures.

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 1998.

**Table 3. Selected Demographic and Socio-economic Information for Interior Columbia Basin SDEIS Counties.**

State	County	1990 Population <sup>1</sup>	1998 Population <sup>1</sup>	1990-1998 Population Change (%)	1997 Civilian Labor Force Employed <sup>2</sup>	Percent of 1997 Labor Force Unemployed <sup>2</sup>	1997 Per Capita Income <sup>3</sup>	1995 Percent Below Poverty Threshold <sup>4</sup>	BLM & FS Lands (%) <sup>5</sup>	FS/BLM Timber Supply (%) <sup>5</sup>	FS/BLM Forage Supply (%) <sup>5</sup>	Federal Lands Payments (%) <sup>5</sup>	Economic Diversity <sup>5</sup>	Socio- Economic Resiliency <sup>6</sup>
ID	Ada	205,775	275,687	34.0	149,075	3.2	\$27,887	8.6	46	71	1	0.3	H	H
ID	Adams	3,254	3,804	16.9	1,565	14.4	\$15,908	14.0	65	71	24	29.0	L	L
ID	Bannock	66,026	74,866	13.4	37,110	5.5	\$18,596	13.2	33	*	6	0.6	M	H
ID	Benewah	7,937	9,119	14.9	4,002	10.1	\$18,294	14.6	10	18	1	2.6	L	L
ID	Bingham	37,583	41,820	11.3	20,314	5.0	\$15,586	15.2	29	*	3	0.6	L	M
ID	Blaine	13,552	17,200	26.9	10,214	4.9	\$33,272	6.6	76	*	14	5.7	M	L
ID	Boise	3,509	5,114	45.7	2,403	6.6	\$19,303	10.8	77	71	17	36.0	L	L
ID	Bonner	26,622	35,226	32.3	15,484	8.8	\$17,201	15.1	45	45	1	6.3	H	H
ID	Bonneville	72,207	80,672	11.7	43,456	3.9	\$20,565	11.1	54	*	8	0.7	M	H
ID	Boundary	8,332	9,800	17.6	4,170	8.8	\$15,682	16.7	61	45	1	17.3	M	L
ID	Butte	2,918	3,033	3.9	1,578	4.8	\$19,061	13.8	86	*	20	10.0	L	L
ID	Camas	727	846	16.4	444	4.6	\$17,732	7.9	65	*	39	12.0	L	L
ID	Canyon	90,076	120,266	33.5	55,292	5.6	\$16,956	14.8	6	71	0	0.1	H	H
ID	Caribou	6,963	7,426	6.6	3,146	6.2	\$18,668	9.2	40	*	15	9.0	L	L
ID	Cassia	19,532	21,359	9.4	9,085	7.0	\$18,035	15.5	56	*	9	6.0	M	M
ID	Clark	762	873	14.6	645	4.2	\$19,777	9.9	66	*	34	10.5	L	L
ID	Clearwater	8,505	9,310	9.5	3,801	12.2	\$16,947	13.1	59	33	4	16.4	L	L
ID	Custer	4,133	4,107	-0.6	2,254	7.0	\$20,973	12.0	93	*	36	21.0	L	L
ID	Elmore	21,205	25,173	18.7	8,300	6.3	\$16,632	12.1	73	*	9	35.6	L	L
ID	Fremont	10,937	11,897	8.8	4,256	8.0	\$14,464	14.5	60	75	11	7.0	L	L
ID	Gem	11,844	14,816	25.1	5,959	6.7	\$16,803	15.1	38	71	3	4.0	M	M
ID	Gooding	11,633	13,626	17.1	6,675	4.2	\$18,858	15.1	53	*	1	4.2	M	M
ID	Idaho	13,768	15,066	9.4	5,801	10.8	\$15,832	15.7	83	65	6	44.4	M	L
ID	Jefferson	16,543	19,118	15.6	9,262	4.4	\$14,972	13.8	53	*	1	2.4	L	M
ID	Jerome	15,138	17,962	18.7	8,826	4.7	\$18,178	14.7	26	*	1	2.0	M	M
ID	Kootenai	69,795	101,390	45.3	48,805	8.5	\$20,698	11.0	32	37	1	3.0	H	H
ID	Latah	30,617	32,051	4.7	14,465	3.5	\$18,815	13.3	17	19	8	5.3	L	M
ID	Lemhi	6,899	8,030	16.4	3,932	9.2	\$16,657	15.5	91	75	17	19.2	M	L
ID	Lewis	3,516	4,007	14.0	1,519	7.7	\$17,970	15.1	3	33	1	*	L	L
ID	Lincoln	3,308	3,792	14.6	2,096	5.1	\$15,896	15.0	75	*	4	8.0	L	L
ID	Madison	23,674	23,569	-0.4	9,446	3.3	\$13,336	15.3	20	75	2	0.6	L	M
ID	Minidoka	19,361	20,207	4.4	9,404	8.2	\$16,048	16.2	36	*	1	2.2	L	M
ID	Nez Perce	33,754	36,852	9.2	22,200	3.6	\$22,409	11.4	4	19	0	0.2	H	H
ID	Oneida	3,492	4,051	16.0	1,661	3.5	\$14,798	12.7	53	*	16	3.6	L	L
ID	Owyhee	8,392	10,277	22.5	4,588	2.8	\$14,225	21.7	76	*	23	6.0	L	L
ID	Payette	16,434	20,519	24.9	9,377	7.9	\$15,791	17.5	26	*	1	0.7	M	H
ID	Power	7,086	8,309	17.3	3,234	6.3	\$16,224	15.4	34	*	4	*	L	L



Table 3. Selected Demographic and Socio-economic Information for Interior Columbia Basin SDEIS Counties. (continued)

State	County	1990 Population <sup>1</sup>	1998 Population <sup>1</sup>	1990-1998 Population Change (%)	1997 Civilian Labor Force Employed <sup>2</sup>	Percent of 1997 Labor Force Unemployed <sup>2</sup>	1997 Per Capita Income <sup>3</sup>	1995 Percent Below Poverty Threshold <sup>4</sup>	BLM & FS Lands (%) <sup>5</sup>	FS/BLM Timber Supply (%) <sup>5</sup>	FS/BLM Forage Supply (%) <sup>5</sup>	Federal Lands Payments (%) <sup>5</sup>	Economic Diversity <sup>5</sup>	Socio- Economic Resiliency <sup>6</sup>
ID	Shoshone	13,931	13,870	-0.4	6,209	10.2	\$17,871	21.4	75	45	12	36.7	L	L
ID	Teton	3,439	5,488	59.6	2,617	4.8	\$13,800	10.1	33	*	4	3.6	L	L
ID	Twin Falls	53,580	62,265	16.2	31,774	4.6	\$19,238	13.6	52	*	8	*	H	H
ID	Valley	6,109	8,005	31.0	3,847	9.9	\$21,456	12.6	88	71	17	38.7	M	L
ID	Washington	8,550	10,171	19.0	4,210	8.3	\$14,823	18.4	37	*	7	6.0	M	L
MT	Deer Lodge	10,356	9,999	-3.4	3,538	6.4	\$15,890	19.8	39	*	2	0.8	L	M
MT	Flathead	59,218	71,831	21.3	34,849	7.4	\$20,067	14.4	74	47	1	1.6	H	H
MT	Granite	2,548	2,667	4.7	1,066	7.2	\$16,608	19.4	64	14	4	3.6	L	L
MT	Lake	21,041	25,648	21.9	10,193	7.0	\$16,555	22.8	18	14	0	0.5	M	M
MT	Lewis and Clark	47,495	53,655	13.0	26,984	4.9	\$21,635	12.6	48	23	1	1.2	M	H
MT	Lincoln	17,481	18,696	7.0	6,386	12.1	\$14,190	18.3	76	*	17	9.4	M	L
MT	Mineral	3,315	3,748	13.1	1,527	8.0	\$13,260	20.0	83	69	3	4.2	L	L
MT	Missoula	78,687	88,989	13.1	47,864	4.7	\$21,496	16.3	43	14	1	0.6	H	H
MT	Powell	6,620	7,000	5.7	2,319	5.5	\$15,375	19.6	49	66	1	4.4	L	L
MT	Ravalli	25,010	35,156	40.6	15,280	5.5	\$16,584	16.0	73	66	1	3.0	L	M
MT	Sanders	8,669	10,185	17.5	3,649	10.7	\$14,471	20.6	52	69	0	4.2	M	L
MT	Silver Bow	33,941	34,560	1.8	16,574	5.0	\$20,571	16.0	52	66	10	0.4	L	H
OR	Baker	15,317	16,448	7.4	6,770	10.1	\$17,847	16.7	51	65	8	4.5	M	M
OR	Crook	14,111	17,236	22.1	6,980	10.1	\$18,274	11.5	49	74	10	15.2	L	L
OR	Deschutes	74,976	105,640	40.9	49,670	8.1	\$22,961	10.6	75	75	17	3.4	H	H
OR	Gilliam	1,717	2,023	17.8	1,180	5.6	\$14,455	7.4	7	0	1	0.4	L	L
OR	Grant	7,853	8,075	2.8	3,650	13.5	\$18,451	13.4	61	85	15	30.9	L	L
OR	Harney	7,060	7,198	2.0	3,390	9.8	\$17,479	14.8	70	95	20	21.3	L	L
OR	Hood River	16,903	19,553	15.7	9,840	10.7	\$19,859	15.2	62	50	2	5.5	H	H
OR	Jefferson	13,676	16,627	21.6	7,800	6.6	\$17,125	17.3	18	36	17	2.6	M	M
OR	Klamath	57,702	63,185	9.5	26,970	9.6	\$18,466	17.2	49	52	4	8.1	H	H
OR	Lake	7,186	7,152	-0.5	3,320	11.7	\$19,115	15.4	68	60	15	20.0	L	L
OR	Malheur	26,038	28,542	9.6	13,200	8.7	\$17,106	20.8	73	0	18	1.5	L	L
OR	Morrow	7,625	9,985	31.0	3,850	9.0	\$15,585	8.3	11	46	3	1.1	L	L
OR	Sherman	1,918	1,789	-6.7	990	5.7	\$13,709	11.6	10	0	1	0.7	L	L
OR	Umatilla	59,249	65,495	10.5	30,810	8.0	\$19,013	17.0	20	41	2	0.6	H	H
OR	Union	23,598	24,829	5.2	11,470	7.9	\$18,401	14.5	8	49	5	2.3	M	H
OR	Walla Walla	6,911	7,368	6.6	3,210	10.6	\$19,100	14.2	58	56	18	9.7	M	L
OR	Wasco	21,683	23,059	6.3	10,440	8.9	\$20,374	13.3	16	27	2	3.9	M	M
OR	Wheeler	1,396	1,566	12.2	570	12.3	\$13,798	12.9	28	57	5	32.3	L	L
WA	Adams	13,603	15,324	12.7	11,590	3.7	\$18,397	17.6	0	0	0	0.0	L	L

WA Asotin	17,605	21,264	20.8	11,590	3.7	\$19,622	15.4	16	46	1	0.2	M	H
WA Benton	112,560	136,250	21.0	66,300	6.6	\$22,807	8.7	1	0	1	<1	M	H
WA Chelan	52,250	60,052	14.9	32,470	7.9	\$22,723	14.2	72	59	33	0.8	H	H
WA Columbia	4,024	4,156	3.3	1,270	11.8	\$18,324	15.4	29	46	2	1.3	L	L
WA Douglas	26,205	33,631	28.3	18,020	6.4	\$18,177	10.2	3	0	2	0.1	L	M
WA Ferry	6,295	7,170	13.9	2,670	9.8	\$14,663	18.1	35	26	14	1.2	L	L
WA Franklin	37,473	46,459	24.0	20,200	9.4	\$17,311	18.6	3	0	1	<1	M	H
WA Garfield	2,248	2,330	3.6	1,060	3.6	\$20,664	9.9	21	75	3	1.3	L	L
WA Grant	54,798	70,545	28.7	33,250	8.6	\$18,430	15.8	3	0	15	0.1	M	M
WA Kittitas	26,725	31,714	18.7	14,460	6.0	\$18,802	14.1	25	29	1	0.9	L	M
WA Klickitat	16,616	19,295	16.1	7,920	10.6	\$18,041	16.0	3	4	1	0.1	L	M
WA Lincoln	8,864	9,734	9.8	4,790	4.6	\$23,411	10.8	1	0	1	0.1	L	L
WA Okanogan	33,350	38,237	14.7	21,180	9.4	\$18,744	19.7	46	34	10	1.3	L	L
WA Pend Oreille	8,915	11,526	29.3	3,600	13.0	\$16,254	18.0	59	31	4	1.2	M	L
WA Spokane	361,333	408,669	13.1	197,400	4.6	\$22,293	10.7	0	0	0	0.0	H	H
WA Stevens	30,948	39,464	27.5	15,710	9.1	\$16,071	12.2	16	13	1	0.4	H	H
WA Walla Walla	48,439	53,702	10.9	25,170	6.3	\$19,530	15.4	0	0	0	0.0	H	H
WA Whitman	38,775	39,487	1.8	18,840	1.8	\$17,564	14.7	0	0	0	0.0	L	M
WA Yakima	188,823	218,062	15.5	103,700	10.0	\$19,367	14.6	2	26	1	0.4	H	H

**Abbreviations used in this Table:**

BLM - Bureau of Land Management

FS - Forest Service

\* Not available, not applicable, or not calculated; H = High; M = Medium; L = Low

<sup>1,4</sup> Source: U.S. Department of Commerce, Bureau of Census. 1999.<sup>2,3</sup> Source: Idaho, Montana, Oregon and Washington state departments of employment and labor.

<sup>5</sup> Note: BLM/FS Lands % = percentage of county land area administered by the BLM or Forest Service; FS/BLM Timber/Forage Supply % = amount of timber or livestock forage produced with the county coming from FS- or BLM-administered lands; Federal Lands Payments % = percentage of the county budget (in the early 1990s) derived from federal revenue-sharing payments based on BLM- or Forest Service-administered lands. Source: USDA Forest Service and USDI Bureau of Land Management. Eastside and Upper Columbia River Basin Draft EISs. 1997. (For specific references and footnotes for these information items, see the Upper Columbia River Basin DEIS, Table 2-16, for Idaho and Montana counties, and the Eastside DEIS, Tables 2-22 and 2-23, for Oregon and Washington counties.)

<sup>6</sup> Horne and Haynes, 1999.



**Table 4. Primary Race and Ethnic Population Percentages<sup>1</sup> for Interior Columbia Basin SDEIS Counties (1998 estimates)<sup>2</sup>.**

State	County	White percent	Black percent	American Indian percent	Pacific Islander percent	Hispanic percent
ID	Ada	97	0.7	0.7	1.7	3.9
ID	Adams	98.6	0.2	1.2	0.1	1.9
ID	Bannock	94.7	1.2	2.7	1.3	6.0
ID	Benewah	92.2	0.2	7.3	0.4	2.3
ID	Bingham	91.8	0.5	6.8	0.9	12.8
ID	Blaine	98.5	0.1	0.4	0.9	4.1
ID	Boise	98.3	0.2	1.0	0.5	3.5
ID	Bonner	98.5	0.3	0.8	0.3	2.1
ID	Bonneville	97.6	0.6	0.6	1.2	5.8
ID	Boundary	97.8	0.1	1.7	0.4	4.0
ID	Butte	98.9	0.1	0.8	0.2	4.7
ID	Camas	97.2	1.1	1.2	0.6	1.4
ID	Canyon	97.3	0.4	0.8	1.4	17.9
ID	Caribou	98.4	1.1	0.3	0.2	4.6
ID	Cassia	98.3	0.0	1.0	0.6	17.7
ID	Clark	98.6	0.7	0.6	0.1	12.4
ID	Clearwater	97.2	0.3	2.1	0.4	2.2
ID	Custer	98.4	0.1	0.9	0.6	3.4
ID	Elmore	91.9	4.5	0.9	2.7	10.4
ID	Fremont	98.3	0.1	1.0	0.6	9.3
ID	Gem	97.7	0.2	1.6	0.5	6.9
ID	Gooding	99.1	0.1	0.5	0.3	12.0
ID	Idaho	97.3	0.1	2.4	0.3	1.4
ID	Jefferson	98.3	0.5	0.8	0.3	9.7
ID	Jerome	98.7	0.1	0.7	0.4	9.1
ID	Kootenai	98.3	0.2	1.0	0.6	2.2
ID	Latah	95.7	0.9	0.7	2.7	2.1
ID	Lemhi	98.6	0.3	0.7	0.4	3.1
ID	Lewis	94.5	0.2	4.4	0.9	2.0
ID	Lincoln	98.2	0.1	1.2	0.4	8.0
ID	Madison	97.6	0.5	0.5	1.4	4.3
ID	Minidoka	96.0	1.9	1.2	0.8	25.9
ID	NezPerce	94.2	0.3	4.8	0.8	1.7
ID	Oneida	98.8	0.2	0.6	0.4	2.4
ID	Owyhee	95.1	0.3	3.5	1.1	22.0
ID	Payette	97.5	0.2	1.2	1.0	10.1
ID	Power	95.9	0.2	2.9	1.0	17.7
ID	Shoshone	98.1	0.2	1.3	0.4	2.5
ID	Teton	99.4	0.1	0.4	0.1	9.0
ID	TwinFalls	97.8	0.3	0.7	1.2	8.0
ID	Valley	98.2	0.3	1.0	0.6	2.7
ID	Washington	97.4	0.2	0.5	1.9	15
MT	DeerLodge	96.4	0.5	2.9	0.3	1.9
MT	Flathead	97.7	0.1	1.7	0.4	1.2
MT	Granite	98.8	0.0	0.9	0.3	0.4
MT	Lake	76.7	0.1	23.0	0.2	1.9
MT	Lewis and Clark	96.7	0.2	2.6	0.6	1.4
MT	Lincoln	97.8	0.1	1.7	0.4	1.3
MT	Mineral	96.9	0.1	2.3	0.7	1.4
MT	Missoula	95.8	0.3	2.7	1.2	1.5
MT	Powell	94.0	0.4	5.2	0.4	1.5
MT	Ravalli	98.2	0.2	1.3	0.3	1.7
MT	Sanders	93.2	0.2	6.1	0.5	1.4
MT	SilverBow	97.7	0.2	1.7	0.5	2.8
OR	Baker	98.3	0.2	1.0	0.5	2.8

**Table 4. Primary Race and Ethnic Population Percentages<sup>1</sup> for Interior Columbia Basin SDEIS Counties (1998 estimates)<sup>2</sup>. (continued)**

State	County	White percent	Black percent	American Indian percent	Pacific Islander percent	Hispanic percent
OR	Crook	97.8	0.1	1.6	0.5	4.3
OR	Deschutes	98.1	0.2	0.9	0.8	3.3
OR	Gilliam	98.8	0.0	0.5	0.7	3.1
OR	Grant	98.5	0.1	1.1	0.3	2.8
OR	Harney	95.7	0.1	3.6	0.7	4.9
OR	HoodRiver	95.8	0.5	1.2	2.4	23.1
OR	Jefferson	81.7	0.2	17.4	0.6	14.6
OR	Klamath	93.9	0.9	4.1	1.0	7.9
OR	Lake	96.3	0.1	2.8	0.9	5.8
OR	Malheur	94.0	0.5	1.4	4.1	27.4
OR	Morrow	98.2	0.1	1.2	0.5	15.6
OR	Sherman	97.8	0.0	1.4	0.8	2.2
OR	Umatilla	94.6	0.8	3.4	1.3	13.2
OR	Union	97.0	0.5	1.1	1.5	2.4
OR	Wallowa	99.0	0.1	0.5	0.5	2.8
OR	Wasco	94.0	0.4	4.1	1.5	7.4
OR	Wheeler	99.0	0.1	0.8	0.1	1.7
WA	Adams	98.2	0.3	0.4	1.2	43.0
WA	Asotin	97.4	0.3	1.5	0.8	2.4
WA	Benton	95.2	1.2	0.9	2.8	11.0
WA	Chelan	97.7	0.2	1.1	1.0	13.4
WA	Columbia	98.8	0.1	0.6	0.5	15.9
WA	Douglas	98.0	0.2	0.9	0.8	13.7
WA	Ferry	80.5	0.4	18.7	0.5	2.0
WA	Franklin	91.9	4.3	0.9	3.0	39.1
WA	Garfield	99.1	0.0	0.5	0.4	1.6
WA	Grant	95.9	1.3	1.2	1.6	23.7
WA	Kittitas	96.4	0.6	0.9	2.1	3.7
WA	Klickitat	95.1	0.2	3.5	1.1	7.9
WA	Lincoln	97.8	0.2	1.6	0.5	1.5
WA	Okanogan	87.5	0.2	11.5	0.7	10.9
WA	PendOreille	97.1	0.2	2.3	0.4	2.1
WA	Spokane	94.2	1.7	1.6	2.5	2.9
WA	Stevens	92.9	0.3	6.0	0.8	2.3
WA	WallaWalla	95.0	2.1	1.0	1.8	13.4
WA	Whitman	90.9	1.4	0.7	7.1	2.5
WA	Yakima	90.8	1.6	5.6	1.9	31.6

<sup>1</sup> Race categories by which Census maintains population counts (columns 3, 4, 5 and 6). The last column (Hispanic) is an ethnicity category that goes across the four race categories. Therefore, the first four columns will add to 100%; the last column is a "non-add" column.

<sup>2</sup> The race and Hispanic origin categories used by the Census Bureau are mandated by Office of Management and Budget Directive No. 15, which requires all federal record keeping and data presentation to use four race categories (White, Black, American Indian and Alaska Native, Asian and Pacific Islander) and two ethnicity categories (Hispanic, non-Hispanic). These classifications are not intended to be scientific in nature, but are designed to promote consistency in federal record keeping and data presentation.

Source: U.S. Department of Commerce, Bureau of Census, 1999-b.



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup>

Place No. <sup>2</sup>	State	County	Town	Population 1992 <sup>3</sup>	Isolated Community or City Circle Association	Associated w/American Indian Reservation	FS or BLM Office	% of FS or BLM land within 20-mile Radius	Subbasin Number / Name <sup>4</sup>
1	ID	Ada	Boise	125738	Boise		Yes	23%	55 / Lower Boise
2	ID	Ada	Eagle	3694	Boise			14%	55 / Lower Boise
3	ID	Ada	Garden City	7034	Boise			19%	55 / Lower Boise
4	ID	Ada	Kuna	2238	Boise			20%	55 / Lower Boise
5	ID	Ada	Meridian	11181	Boise			13%	55 / Lower Boise
6	ID	Adams	Council	951	Isolated		Yes	44%	158 / Weiser
7	ID	Adams	Indian Valley		Isolated			42%	158 / Weiser
8	ID	Adams	New Meadows	620	Isolated		Yes	61%	50 / Little Salmon
9	ID	Bannock	Arimo	314	Pocatello			26%	104 / Portneuf
10	ID	Bannock	Chubbuck	8354	Pocatello			17%	104 / Portneuf
11	ID	Bannock	Downey	672	Pocatello			13%	104 / Portneuf
12	ID	Bannock	Fort Hall	1453	Blackfoot	Yes		13%	2 / American Falls
13	ID	Bannock	Inkom	753	Pocatello			27%	104 / Portneuf
14	ID	Bannock	Lava Hot Springs	464	Pocatello			23%	104 / Portneuf
15	ID	Bannock	McCammon	763	Pocatello			30%	104 / Portneuf
16	ID	Bannock	Pocatello	47914	Pocatello	Yes	Yes	18%	104 / Portneuf
18	ID	Bear Lake	Bloomington <sup>5</sup>	184	Isolated			0%	Bear Lake
19	ID	Bear Lake	Dingle <sup>5</sup>		Isolated			1%	Bear Lake
17	ID	Bear Lake	Fishhaven <sup>5</sup>		Isolated			0%	Bear Lake
20	ID	Bear Lake	Geneva <sup>5</sup>		Isolated			14%	Central Bear
21	ID	Bear Lake	Georgetown <sup>5</sup>	659	Isolated			19%	Bear Lake
22	ID	Bear Lake	Montpelier <sup>5</sup>	2656	Isolated			6%	Bear Lake
24	ID	Bear Lake	Ovid		Isolated			2%	Bear Lake
25	ID	Benewah	Parkline	73	Spokane	Yes		10%	124 / St. Joe
26	ID	Benewah	Plummer	763	Spokane	Yes		4%	124 / St. Joe
27	ID	Benewah	St. Maries	2669	Spokane	Yes	Yes	17%	124 / St. Joe
28	ID	Benewah	Tensed	91	Spokane	Yes		7%	36 / Hangman
29	ID	Bingham	Aberdeen	1548	Blackfoot			27%	2 / American Falls
60	ID	Bingham	Atomic City	26	Blackfoot			39%	2 / American Falls
30	ID	Bingham	Basalt	450	Blackfoot			15%	2 / American Falls
31	ID	Bingham	Blackfoot	10628	Blackfoot	Yes		15%	2 / American Falls
32	ID	Bingham	Firth	456	Blackfoot			15%	2 / American Falls
33	ID	Bingham	Shelley	3744	Blackfoot			16%	2 / American Falls
34	ID	Blaine	Bellevue	1433	Isolated Trade Center			62%	7 / Big Wood
35	ID	Blaine	Hailey	4252	Isolated Trade Center			65%	7 / Big Wood
36	ID	Blaine	Ketchum	2685	Isolated Trade Center		Yes	86%	7 / Big Wood
37	ID	Blaine	Sun Valley	997	Isolated			85%	7 / Big Wood
41	ID	Boise	Banks	570	Boise			46%	96 / North Fork Payette
457	ID	Boise	Crouch	75	Boise			56%	84 / Middle Fork Payette
38	ID	Boise	Garden Valley		Boise			56%	84 / Middle Fork Payette

39	ID	Boise	Horseshoe Bend	726	Boise			31%	101 / Payette
40	ID	Boise	Idaho City	373	Boise		Yes	65%	12 / Boise-Mores
458	ID	Boise	Placerville	14	Boise			54%	12 / Boise-Mores
42	ID	Bonner	Clark Fork	471	Isolated			66%	56 / Lower Clark Fork
43	ID	Bonner	Dover	335	Coeur d'Alene			27%	103 / Pend Oreille Lake
44	ID	Bonner	East Hope	231	Coeur d'Alene			52%	103 / Pend Oreille Lake
45	ID	Bonner	Hope	116	Coeur d'Alene			51%	103 / Pend Oreille Lake
46	ID	Bonner	Kootenai	317	Coeur d'Alene			32%	103 / Pend Oreille Lake
459	ID	Bonner	Laclede	400	Spokane			19%	103 / Pend Oreille Lake
47	ID	Bonner	Oldtown	166	Spokane			21%	102 / Pend Oreille
48	ID	Bonner	Ponderay	491	Coeur d'Alene			31%	103 / Pend Oreille Lake
460	ID	Bonner	Priest Lake		Isolated			46%	106 / Priest
49	ID	Bonner	Priest River	1679	Spokane		Yes	20%	103 / Pend Oreille Lake
461	ID	Bonner	Samuels		Isolated			36%	103 / Pend Oreille Lake
50	ID	Bonner	Sandpoint	5725	Coeur d'Alene		Yes	30%	103 / Pend Oreille Lake
51	ID	Bonneville	Ammon	5469	Idaho Falls			10%	39 / Idaho Falls
52	ID	Bonneville	Idaho Falls	48226	Idaho Falls		Yes	12%	39 / Idaho Falls
53	ID	Bonneville	Iona	1107	Idaho Falls			10%	39 / Idaho Falls
54	ID	Bonneville	Irwin	116	Idaho Falls			72%	99 / Palisades
55	ID	Bonneville	Swan Valley	141	Idaho Falls			67%	99 / Palisades
56	ID	Bonneville	Ucon	932	Idaho Falls			12%	39 / Idaho Falls
57	ID	Boundary	Bonnors Ferry	2244	Isolated Trade Center	Yes	Yes	60%	64 / Lower Kootenai
58	ID	Boundary	Moyie Springs	435	Isolated			66%	91 / Moyie
59	ID	Butte	Arco	1029	Isolated			58%	6 / Big Lost
61	ID	Butte	Butte City	65	Isolated			54%	6 / Big Lost
62	ID	Butte	Moore	196	Isolated		Yes	68%	6 / Big Lost
63	ID	Camas	Fairfield	376	Isolated		Yes	61%	19 / Camas
64	ID	Canyon	Caldwell	20800	Boise			14%	55 / Lower Boise
65	ID	Canyon	Greenleaf	681	Boise			23%	55 / Lower Boise
66	ID	Canyon	Melba	272	Boise			38%	89 / Middle Snake-Succor
67	ID	Canyon	Middleton	2081	Boise			10%	55 / Lower Boise
68	ID	Canyon	Nampa	31416	Boise			13%	55 / Lower Boise
69	ID	Canyon	Notus	411	Boise			16%	55 / Lower Boise
70	ID	Canyon	Parma	1702	Boise			25%	55 / Lower Boise
71	ID	Canyon	Wilder	1426	Boise			32%	55 / Lower Boise
72	ID	Caribou	Bancroft	417	Pocatello			17%	104 / Portneuf
73	ID	Cassia	Albion	293	Twin Falls			34%	46 / Lake Walcott
74	ID	Cassia	Burley	8918	Twin Falls		Yes	19%	46 / Lake Walcott
75	ID	Cassia	Declo	289	Twin Falls			23%	46 / Lake Walcott
76	ID	Cassia	Malta	180	Isolated			50%	107 / Raft
77	ID	Cassia	Oakley	607	Twin Falls			53%	31 / Goose
78	ID	Clark	Dubois	480	Isolated		Yes	49%	4 / Beaver-Camas
462	ID	Clark	Spencer	11	Isolated			43%	4 / Beaver-Camas
79	ID	Clearwater	Elk River	153	Isolated			22%	67 / Lower North Fork Clearwater
463	ID	Clearwater	Hall		Isolated			8%	67 / Lower North Fork Clearwater
80	ID	Clearwater	Orofino	3010	Isolated	Yes	Yes	5%	21 / Clearwater
81	ID	Clearwater	Pierce	755	Isolated			39%	21 / Clearwater
82	ID	Clearwater	Weippe	523	Isolated			23%	21 / Clearwater
83	ID	Custer	Challis	995	Isolated		Yes	90%	150 / Upper Salmon
84	ID	Custer	Clayton	20	Isolated		Yes	94%	150 / Upper Salmon



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Population 1992 <sup>3</sup>	Isolated Community or City Circle Association	Associated w/American Indian Reservation	FS or BLM Office	% of FS or BLM land within 20-mile Radius	Subbasin Number / Name <sup>4</sup>
150	ID	Custer	Ellis		Isolated			89%	98 / Pahsimeroi
464	ID	Custer	Lost River	29	Isolated			73%	6 / Big Lost
85	ID	Custer	Mackay	592	Isolated			84%	6 / Big Lost
86	ID	Custer	Stanley	70	Isolated			96%	150 / Upper Salmon
87	ID	Elmore	Glenns Ferry	1359	Isolated			65%	18 / C. J. Strike Reservoir
88	ID	Elmore	Mountain Home	8107	Boise		Yes	49%	18 / C. J. Strike Reservoir
465	ID	Elmore	Mountain Home AFB	5936	Boise			50%	18 / C. J. Strike Reservoir
89	ID	Franklin	Clifton <sup>5</sup>	228	Logan UT			3%	Middle Bear
90	ID	Franklin	Dayton <sup>5</sup>	382	Logan UT			1%	Middle Bear
91	ID	Franklin	Franklin <sup>5</sup>	478	Logan UT			0%	Middle Bear
92	ID	Franklin	Preston <sup>5</sup>	3710	Logan UT			1%	Middle Bear
93	ID	Franklin	Weston <sup>5</sup>	426	Logan UT			0%	Middle Bear
94	ID	Fremont	Ashton	1104	Rexburg		Yes	39%	140 / Upper Henrys
95	ID	Fremont	Drummond	33	Rexburg			38%	62 / Lower Henrys
96	ID	Fremont	Island Park	163	Isolated		Yes	40%	140 / Upper Henrys
97	ID	Fremont	Newdale	361	Rexburg			22%	128 / Teton
98	ID	Fremont	Parker	314	Rexburg			25%	62 / Lower Henrys
99	ID	Fremont	St. Anthony	3393	Rexburg		Yes	23%	62 / Lower Henrys
100	ID	Fremont	Teton	563	Rexburg			22%	128 / Teton
466	ID	Fremont	Warm River	9	Rexburg			48%	140 / Upper Henrys
101	ID	Gem	Emmett	4888	Boise		Yes	20%	101 / Payette
102	ID	Gem	Letha		Boise			19%	101 / Payette
103	ID	Gem	Montour		Boise			30%	101 / Payette
104	ID	Gem	Ola		Isolated			43%	101 / Payette
105	ID	Gem	Sweet		Boise			33%	101 / Payette
106	ID	Gooding	Bliss	196	Twin Falls			61%	152 / Upper Snake-Rock
107	ID	Gooding	Gooding	3066	Twin Falls			52%	52 / Little Wood
108	ID	Gooding	Hagerman	669	Twin Falls			48%	152 / Upper Snake-Rock
109	ID	Gooding	Wendell	2179	Twin Falls			33%	152 / Upper Snake-Rock
110	ID	Idaho	Cottonwood	852	Isolated		Yes	5%	117 / South Fork Clearwater
111	ID	Idaho	Elk City	670	Isolated		Yes	98%	117 / South Fork Clearwater
112	ID	Idaho	Ferdinand	141	Isolated	Yes		4%	21 / Clearwater
113	ID	Idaho	Grangeville	3208	Isolated Trade Center		Yes	35%	117 / South Fork Clearwater
467	ID	Idaho	Keuterville		Isolated			5%	69 / Lower Salmon
114	ID	Idaho	Kooskia	708	Isolated	Yes	Yes	30%	117 / South Fork Clearwater
115	ID	Idaho	Riggins	460	Isolated			82%	69 / Lower Salmon
468	ID	Idaho	Stites	204	Isolated	Yes		34%	117 / South Fork Clearwater
116	ID	Idaho	White Bird	109	Isolated		Yes	49%	69 / Lower Salmon
117	ID	Jefferson	Hamer	86	Idaho Falls			38%	4 / Beaver-Camas
118	ID	Jefferson	Lewisville	549	Idaho Falls			20%	39 / Idaho Falls

119	ID	Jefferson	Menan	768	Idaho Falls		19%	39 / Idaho Falls
120	ID	Jefferson	Mudlake	179	Idaho Falls		26%	76 / Medicine Lodge
121	ID	Jefferson	Rigby	2950	Idaho Falls		16%	39 / Idaho Falls
122	ID	Jefferson	Ririe	665	Idaho Falls		15%	39 / Idaho Falls
123	ID	Jefferson	Roberts	647	Idaho Falls		24%	39 / Idaho Falls
124	ID	Jerome	Eden	329	Twin Falls		31%	152 / Upper Snake-Rock
125	ID	Jerome	Hazelton	426	Twin Falls		31%	152 / Upper Snake-Rock
126	ID	Jerome	Jerome	7077	Twin Falls		29%	152 / Upper Snake-Rock
127	ID	Kootenai	Athol	409	Coeur d'Alene		33%	103 / Pend Oreille Lake
469	ID	Kootenai	Cataldo		Coeur d'Alene		58%	22 / Coeur d'Alene Lake
128	ID	Kootenai	Coeur d'Alene	26611	Coeur d'Alene	Yes	26%	153 / Upper Spokane
129	ID	Kootenai	Dalton Gardens	2170	Coeur d'Alene		29%	153 / Upper Spokane
130	ID	Kootenai	Fernan Lake	186	Coeur d'Alene		28%	22 / Coeur d'Alene Lake
131	ID	Kootenai	Harrison	232	Spokane	Yes	12%	22 / Coeur d'Alene Lake
132	ID	Kootenai	Hauser	427	Spokane		6%	153 / Upper Spokane
133	ID	Kootenai	Hayden	4693	Coeur d'Alene		28%	153 / Upper Spokane
134	ID	Kootenai	Hayden Lake	374	Coeur d'Alene		31%	153 / Upper Spokane
135	ID	Kootenai	Huetter	85	Coeur d'Alene		21%	153 / Upper Spokane
136	ID	Kootenai	Post Falls	8494	Spokane		12%	153 / Upper Spokane
137	ID	Kootenai	Rathdrum	2382	Spokane		16%	153 / Upper Spokane
138	ID	Kootenai	Spirit Lake	883	Spokane		14%	103 / Pend Oreille Lake
470	ID	Kootenai	State Line	26	Isolated		4%	153 / Upper Spokane
139	ID	Kootenai	Worley	194	Spokane	Yes	4%	36 / Hangman
471	ID	Latah	Bovil	256	Isolated		27%	21 / Clearwater
472	ID	Latah	Deary	548	Moscow		22%	21 / Clearwater
140	ID	Latah	Genesee	783	Moscow		0%	100 / Palouse
473	ID	Latah	Juliaetta	514	Moscow		2%	21 / Clearwater
474	ID	Latah	Kendrick	325	Lewiston		5%	21 / Clearwater
475	ID	Latah	Moscow	19122	Moscow		0%	100 / Palouse
141	ID	Latah	Onaway	208	Moscow		11%	100 / Palouse
476	ID	Latah	Potlatch	743	Moscow	Yes	10%	100 / Palouse
477	ID	Latah	Princeton		Moscow		13%	100 / Palouse
142	ID	Latah	Troy	782	Moscow		8%	21 / Clearwater
143	ID	Lemhi	Carmen		Isolated	Yes	71%	87 / Middle Salmon-Panther
144	ID	Lemhi	Gibbonville		Isolated		63%	87 / Middle Salmon-Panther
145	ID	Lemhi	Leadore	85	Isolated	Yes	63%	47 / Lemhi
146	ID	Lemhi	Lemhi		Isolated		68%	47 / Lemhi
147	ID	Lemhi	May		Isolated		86%	98 / Pahsimeroi
148	ID	Lemhi	Salmon	3093	Isolated Trade Center	Yes	75%	87 / Middle Salmon-Panther
149	ID	Lemhi	Tendoy		Isolated		59%	47 / Lemhi
151	ID	Lewis	Craigmont	571	Lewiston	Yes	3%	21 / Clearwater
152	ID	Lewis	Kamiah	1190	Isolated	Yes	17%	21 / Clearwater
153	ID	Lewis	Nez Perce	471	Isolated	Yes	2%	21 / Clearwater
478	ID	Lewis	Reubens	46	Lewiston	Yes	2%	21 / Clearwater
154	ID	Lewis	Winchester	272	Lewiston	Yes	4%	21 / Clearwater
155	ID	Lincoln	Dietrich	129	Twin Falls		62%	52 / Little Wood
156	ID	Lincoln	Richfield	380	Twin Falls		73%	52 / Little Wood
157	ID	Lincoln	Shoshone	1273	Twin Falls	Yes	57%	52 / Little Wood
158	ID	Madison	Rexburg	14497	Rexburg		21%	128 / Teton
159	ID	Madison	Sugar City	1410	Rexburg		22%	128 / Teton
160	ID	Minidoka	Acequia	103	Twin Falls		35%	46 / Lake Walcott



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Population 1992 <sup>3</sup>	Isolated Community or City Circle Association	Associated w/American Indian Reservation	FS or BLM Office	% of FS or BLM land within 20-mile Radius	Subbasin Number / Name <sup>4</sup>
161	ID	Minidoka	Heyburn	2836	Twin Falls			19%	46 / Lake Walcott
162	ID	Minidoka	Minidoka	64	Twin Falls			52%	46 / Lake Walcott
163	ID	Minidoka	Paul	1000	Twin Falls			19%	46 / Lake Walcott
164	ID	Minidoka	Rupert	5636	Twin Falls			24%	46 / Lake Walcott
165	ID	Nez Perce	Culdesac	289	Lewiston	Yes		1%	21 / Clearwater
166	ID	Nez Perce	Lapwai	1006	Lewiston	Yes		1%	21 / Clearwater
167	ID	Nez Perce	Lenore		Lewiston	Yes		3%	21 / Clearwater
168	ID	Nez Perce	Lewiston	29119	Lewiston	Yes		1%	21 / Clearwater
169	ID	Nez Perce	Peck	166	Lewiston	Yes		3%	21 / Clearwater
170	ID	Nez Perce	Spalding		Lewiston	Yes		1%	21 / Clearwater
171	ID	Oneida	Holbrook <sup>5</sup>		Isolated			7%	Curlew Valley
172	ID	Oneida	Malad City <sup>5</sup>	1946	Pocatello		Yes	4%	Lower Bear-Malad
173	ID	Owyhee	Grand View	355	Isolated			61%	89 / Middle Snake-Succor
174	ID	Owyhee	Homedale	2097	Boise			39%	89 / Middle Snake-Succor
175	ID	Owyhee	Marsing	809	Boise			33%	89 / Middle Snake-Succor
176	ID	Payette	Fruitland	2668	Ontario			21%	101 / Payette
177	ID	Payette	New Plymouth	1465	Ontario			19%	101 / Payette
178	ID	Payette	Payette	6170	Ontario			22%	88 / Middle Snake-Payette
179	ID	Power	American Falls	4008	Pocatello			20%	2 / American Falls
180	ID	Power	Arbon Valley	628	Pocatello	Yes		15%	2 / American Falls
181	ID	Power	Rockland	305	Pocatello			24%	46 / Lake Walcott
182	ID	Shoshone	Kellogg	2495	Coeur d'Alene			67%	118 / South Fork Coeur d'Alene
183	ID	Shoshone	Mullan	815	Isolated			83%	118 / South Fork Coeur d'Alene
184	ID	Shoshone	Osburn	1507	Isolated			72%	118 / South Fork Coeur d'Alene
185	ID	Shoshone	Pinehurst	1785	Coeur d'Alene			62%	118 / South Fork Coeur d'Alene
545	ID	Shoshone	Silverton	750	Isolated		Yes	74%	118 / South Fork Coeur d'Alene
186	ID	Shoshone	Smelterville	453	Coeur d'Alene			66%	118 / South Fork Coeur d'Alene
187	ID	Shoshone	Wallace	994	Isolated			74%	118 / South Fork Coeur d'Alene
188	ID	Shoshone	Wardner	247	Coeur d'Alene			65%	118 / South Fork Coeur d'Alene
189	ID	Teton	Driggs	980	Rexburg		Yes	53%	128 / Teton
190	ID	Teton	Tetonia	153	Rexburg			47%	128 / Teton
191	ID	Teton	Victor	341	Rexburg			60%	128 / Teton
192	ID	Twin Falls	Buhl	3743	Twin Falls			38%	152 / Upper Snake-Rock
193	ID	Twin Falls	Castleford	176	Twin Falls			54%	152 / Upper Snake-Rock
194	ID	Twin Falls	Filer	1716	Twin Falls			29%	152 / Upper Snake-Rock
195	ID	Twin Falls	Hansen	946	Twin Falls			34%	152 / Upper Snake-Rock
196	ID	Twin Falls	Hollister	151	Twin Falls			51%	152 / Upper Snake-Rock
197	ID	Twin Falls	Kimberly	2656	Twin Falls			32%	152 / Upper Snake-Rock
198	ID	Twin Falls	Murtaugh	141	Twin Falls			36%	152 / Upper Snake-Rock
199	ID	Twin Falls	Twin Falls	29684	Twin Falls		Yes	28%	152 / Upper Snake-Rock
200	ID	Valley	Cascade	1001	Isolated		Yes	59%	96 / North Fork Payette

201	ID	Valley	Donnelly	155	Isolated		52%	96 / North Fork Payette
202	ID	Valley	Lakefork		Isolated		56%	96 / North Fork Payette
203	ID	Valley	McCall	2329	Isolated Trade Center	Yes	61%	96 / North Fork Payette
204	ID	Valley	Smiths Ferry		Isolated		58%	96 / North Fork Payette
205	ID	Washington	Cambridge	367	Isolated		37%	158 / Weiser
206	ID	Washington	Midvale	116	Ontario		31%	158 / Weiser
207	ID	Washington	Weiser	4891	Ontario	Yes	25%	13 / Brownlee Reservoir
208	MT	Deer Lodge	Anaconda	10037	Anaconda		29%	132 / Upper Clark Fork
209	MT	Flathead	Columbia Falls	3044	Kalispell	Yes	43%	28 / Flathead Lake
479	MT	Flathead	Evergreen	4109	Kalispell		34%	125 / Stillwater
210	MT	Flathead	Kalispell	12456	Kalispell	Yes	28%	28 / Flathead Lake
480	MT	Flathead	Olney		Kalispell		65%	125 / Stillwater
211	MT	Flathead	Whitefish	4551	Kalispell	Yes	43%	125 / Stillwater
212	MT	Granite	Drummond	270	Isolated		33%	132 / Upper Clark Fork
213	MT	Granite	Philipsburg	902	Anaconda	Yes	57%	29 / Flint-Rock
214	MT	Lake	Arlee	486	Missoula	Yes	24%	60 / Lower Flathead
215	MT	Lake	Charlo	406	Missoula	Yes	11%	60 / Lower Flathead
216	MT	Lake	Finley Point	376	Missoula	Yes	21%	28 / Flathead Lake
217	MT	Lake	Kicking Horse	288	Missoula	Yes	16%	60 / Lower Flathead
218	MT	Lake	Pablo	1264	Missoula	Yes	12%	60 / Lower Flathead
219	MT	Lake	Polson	3621	Missoula	Yes	11%	60 / Lower Flathead
220	MT	Lake	Ronan	1630	Missoula	Yes	14%	60 / Lower Flathead
221	MT	Lake	St. Ignatius	849	Missoula	Yes	17%	60 / Lower Flathead
222	MT	Lincoln	Eureka	1039	Isolated	Yes	60%	144 / Upper Kootenai
481	MT	Lincoln	Fortine		Isolated	Yes	72%	144 / Upper Kootenai
223	MT	Lincoln	Libby	2541	Isolated Trade Center	Yes	74%	144 / Upper Kootenai
224	MT	Lincoln	Rexford	134	Isolated		58%	144 / Upper Kootenai
455	MT	Lincoln	Troy	1054	Isolated	Yes	81%	144 / Upper Kootenai
225	MT	Mineral	Alberton	358	Missoula	Yes	52%	78 / Middle Clark Fork
482	MT	Mineral	Saint Regis	650	Isolated		81%	78 / Middle Clark Fork
226	MT	Mineral	Superior	879	Isolated	Yes	73%	78 / Middle Clark Fork
227	MT	Missoula	Bonnor-W.	1654	Missoula		27%	78 / Middle Clark Fork
228	MT	Missoula	Lolo	2746	Missoula	Yes	42%	9 / Bitterroot
229	MT	Missoula	Missoula	44522	Missoula	Yes	34%	78 / Middle Clark Fork
230	MT	Missoula	Orchard Homes	10317	Missoula		37%	78 / Middle Clark Fork
483	MT	Missoula	Seeley Lake	870	Missoula	Yes	48%	10-11 / Blackfoot
231	MT	Powell	Deer Lodge	3494	Butte	Yes	31%	132 / Upper Clark Fork
232	MT	Ravalli	Darby	679	Isolated	Yes	76%	9 / Bitterroot
233	MT	Ravalli	Hamilton	3023	Missoula	Yes	65%	9 / Bitterroot
234	MT	Ravalli	Pinesdale	665	Missoula		65%	9 / Bitterroot
235	MT	Ravalli	Stevensville	1340	Missoula	Yes	55%	9 / Bitterroot
236	MT	Sanders	Hot Springs	413	Isolated	Yes	17%	60 / Lower Flathead
484	MT	Sanders	Noxon	270	Isolated		82%	56 / Lower Clark Fork
237	MT	Sanders	Plains	1014	Isolated	Yes	48%	56 / Lower Clark Fork
238	MT	Sanders	Thompson Falls	1313	Isolated		77%	56 / Lower Clark Fork
485	MT	Sanders	Trout Creek		Isolated	Yes	81%	56 / Lower Clark Fork
239	MT	Silver Bow	Butte	33555	Butte		13%	132 / Upper Clark Fork
240	MT	Silver Bow	Walkerville	573	Butte		13%	132 / Upper Clark Fork
486	NV	Elko	Owyhee <sup>5</sup>	908	Isolated	Yes	43%	Upper Owyhee
241	OR	Baker	Baker City	9585	Baker City	Yes	39%	105 / Powder



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

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490	OR	Baker	Greenhorn	3	Isolated			87%	16 / Burnt
487	OR	Baker	Haines	410	Baker City			40%	105 / Powder
242	OR	Baker	Halfway	340	Isolated		Yes	63%	13 / Brownlee Reservoir
488	OR	Baker	Huntington	560	Isolated			33%	16 / Burnt
243	OR	Baker	Richland	180	Isolated			52%	105 / Powder
244	OR	Baker	Sumpter	165	Baker City			67%	105 / Powder
245	OR	Baker	Unity	110	Isolated		Yes	56%	16 / Burnt
246	OR	Crook	Prineville	5945	Bend		Yes	37%	58 / Lower Crooked
247	OR	Deschutes	Bend	29425	Bend		Yes	64%	138 / Upper Deschutes
489	OR	Deschutes	Deschutes River Woods	2373	Bend			72%	138 / Upper Deschutes
248	OR	Deschutes	Redmond	9650	Bend		Yes	39%	138 / Upper Deschutes
249	OR	Deschutes	Sisters	765	Bend		Yes	53%	138 / Upper Deschutes
250	OR	Deschutes	Terrebonne	1083	Bend			36%	58 / Lower Crooked
251	OR	Deschutes	Three Rivers	1230	Bend			80%	138 / Upper Deschutes
252	OR	Gilliam	Arlington	460	Isolated			4%	80 / Middle Columbia-Lake Wallula
253	OR	Gilliam	Condon	725	Isolated			8%	63 / Lower John Day
254	OR	Gilliam	Lonerock	20	Isolated			13%	63 / Lower John Day
255	OR	Grant	Canyon City	660	Isolated			54%	141 / Upper John Day
256	OR	Grant	Dayville	145	Isolated			48%	141 / Upper John Day
257	OR	Grant	Granite	10	Isolated			91%	95 / North Fork John Day
258	OR	Grant	John Day	1900	Isolated Trade Center		Yes	53%	141 / Upper John Day
259	OR	Grant	Long Creek	240	Isolated			38%	141 / Middle Fork John Day
260	OR	Grant	Monument	170	Isolated			33%	95 / North Fork John Day
261	OR	Grant	Mount Vernon	625	Isolated			51%	141 / Upper John Day
262	OR	Grant	Prairie City	1160	Isolated Trade Center		Yes	71%	141 / Upper John Day
263	OR	Grant	Seneca	190	Isolated			74%	113 / Silvies
264	OR	Harney	Burns	2870	Isolated Trade Center	Yes		48%	113 / Silvies
265	OR	Harney	Hines	1445	Isolated Trade Center		Yes	45%	113 / Silvies
266	OR	Hood River	Hood River <sup>5</sup>	4875	Hood River		Yes	22%	79 / Middle Columbia-Hood
267	OR	Jefferson	Culver	660	Bend			30%	58 / Lower Crooked
268	OR	Jefferson	Madras	4290	Bend	Yes	Yes	20%	59 / Lower Deschutes
269	OR	Jefferson	Metolius	545	Bend			24%	59 / Lower Deschutes
270	OR	Jefferson	Warm Springs	2287	Isolated	Yes		13%	59 / Lower Deschutes
271	OR	Klamath	Altamont	18591	Klamath Falls		Yes	17%	54 / Lost
272	OR	Klamath	Bonanza	355	Klamath Falls			29%	54 / Lost
273	OR	Klamath	Chiloquin	700	Klamath Falls	Yes	Yes	55%	160 / Williamson
491	OR	Klamath	Gilchrist	600	Isolated		Yes	73%	48 / Little Deschutes
274	OR	Klamath	Klamath Falls	18405	Klamath Falls		Yes	20%	54 / Lost
275	OR	Klamath	Malin	740	Isolated			17%	54 / Lost
276	OR	Klamath	Merrill	835	Klamath Falls			6%	54 / Lost

492	OR	Klamath	Modoc Point		Klamath Falls		44%	160 / Williamson
277	OR	Klamath	Northfork		Isolated		52%	123 / Sprague
278	OR	Lake	Lakeview	2575	Isolated Trade Center	Yes	41%	32 / Goose Lake
279	OR	Lake	Paisley	345	Isolated	Yes	75%	44 / Lake Abert
280	OR	Malheur	Adrian	135	Ontario		41%	89 / Middle Snake-Succor
281	OR	Malheur	Jorden Valley	400	Isolated		63%	41 / Jordan
282	OR	Malheur	Nyssa	2675	Ontario		24%	88 / Middle Snake-Payette
283	OR	Malheur	Ontario	9760	Ontario		20%	88 / Middle Snake-Payette
284	OR	Malheur	Vale	1495	Ontario	Yes	40%	161-162-163 / Willow
285	OR	Morrow	Boardman	2145	Tri-Cities <sup>2</sup>		1%	80 / Middle Columbia-Lake Wallula
286	OR	Morrow	Heppner	1465	Isolated	Yes	5%	161-162-163 / Willow
287	OR	Morrow	lone	250	Isolated		1%	161-162-163 / Willow
288	OR	Morrow	Irrigon	890	Tri-Cities <sup>2</sup>		0%	80 / Middle Columbia-Lake Wallula
289	OR	Morrow	Lexington	285	Isolated		0%	161-162-163 / Willow
290	OR	Sherman	Grass Valley	160	The Dalles		10%	63 / Lower John Day
291	OR	Sherman	Moro	295	The Dalles		9%	63 / Lower John Day
292	OR	Sherman	Rufus	290	The Dalles		3%	79 / Middle Columbia-Hood
293	OR	Sherman	Wasco	385	The Dalles		6%	79 / Middle Columbia-Hood
294	OR	Umatilla	Adams	245	Pendleton	Yes	8%	131 / Umatilla
295	OR	Umatilla	Athena	1050	Pendleton		11%	131 / Umatilla
296	OR	Umatilla	Echo	515	Tri-Cities <sup>2</sup>		1%	131 / Umatilla
297	OR	Umatilla	Helix	155	Pendleton		1%	131 / Umatilla
298	OR	Umatilla	Hermiston	10330	Tri-Cities <sup>2</sup>		1%	131 / Umatilla
299	OR	Umatilla	Milton-Freewater	5865	Walla Walla		11%	155 / Walla Walla
493	OR	Umatilla	Mission	664	Pendleton	Yes	4%	131 / Umatilla
300	OR	Umatilla	Pendleton	15715	Pendleton	Yes	0%	131 / Umatilla
301	OR	Umatilla	Pilot Rock	1540	Pendleton		11%	131 / Umatilla
494	OR	Umatilla	Rieth		Pendleton		0%	131 / Umatilla
302	OR	Umatilla	Stanfield	1620	Tri-Cities <sup>2</sup>		1%	131 / Umatilla
303	OR	Umatilla	Ukiah	260	Isolated	Yes	50%	95 / North Fork John Day
304	OR	Umatilla	Umatilla	3155	Tri-Cities <sup>2</sup>		1%	131 / Umatilla
305	OR	Umatilla	Weston	640	Pendleton		17%	155 / Walla Walla
306	OR	Union	Cove	570	La Grande		39%	139 / Upper Grande Ronde
307	OR	Union	Elgin	1655	La Grande		42%	139 / Upper Grande Ronde
308	OR	Union	Imbler	310	La Grande		38%	139 / Upper Grande Ronde
309	OR	Union	Island City	825	La Grande		37%	139 / Upper Grande Ronde
310	OR	Union	La Grande	12195	La Grande	Yes	37%	139 / Upper Grande Ronde
311	OR	Union	North Powder	515	La Grande		37%	105 / Powder
312	OR	Union	Summerville	150	La Grande		40%	139 / Upper Grande Ronde
313	OR	Union	Union	1915	La Grande		35%	139 / Upper Grande Ronde
314	OR	Wallowa	Enterprise	1935	Isolated Trade Center	Yes	43%	156 / Wallowa
315	OR	Wallowa	Joseph	1165	Isolated		55%	156 / Wallowa
316	OR	Wallowa	Lostine	230	Isolated		40%	156 / Wallowa
317	OR	Wallowa	Wallowa	755	Isolated		33%	156 / Wallowa
318	OR	Wasco	Antelope	35	Isolated		12%	130 / Trout
495	OR	Wasco	Chenoweth	3246	The Dalles		8%	79 / Middle Columbia-Hood
319	OR	Wasco	Dufur	580	The Dalles	Yes	15%	79 / Middle Columbia-Hood
320	OR	Wasco	Maupin	485	Isolated		12%	59 / Lower Deschutes
321	OR	Wasco	Mosier <sup>5</sup>	275	The Dalles		16%	79 / Middle Columbia-Hood
322	OR	Wasco	Shaniko	30	Isolated		12%	63 / Lower John Day
323	OR	Wasco	The Dalles	11325	The Dalles		8%	79 / Middle Columbia-Hood



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

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496	OR	Wasco	Tygh Valley		The Dalles			22%	59 / Lower Deschutes
324	OR	Wheeler	Fossil	470	Isolated			15%	63 / Lower John Day
497	OR	Wheeler	Kinzua		Isolated			11%	63 / Lower John Day
325	OR	Wheeler	Mitchell	165	Isolated			44%	63 / Lower John Day
326	OR	Wheeler	Spray	155	Isolated			24%	63 / Lower John Day
498	WA	Adams	Hatton	71	Tri-Cities <sup>2</sup>			0%	135 / Upper Columbia-Priest Rapids
327	WA	Adams	Lind	470	Isolated			0%	57 / Lower Crab
328	WA	Adams	Othello	4780	Moses Lake			1%	57 / Lower Crab
329	WA	Adams	Ritzville	1750	Isolated			0%	57 / Lower Crab
330	WA	Adams	Washtucna	270	Isolated			0%	135 / Upper Columbia-Priest Rapids
499	WA	Asotin	Asotin	1108	Lewiston			4%	72 / Lower Snake-Asotin
500	WA	Asotin	Clarkston	6750	Lewiston		Yes	1%	73 / Lower Snake-Tucannon
501	WA	Asotin	Clarkston Hts-Vineland	2832	Lewiston			2%	72 / Lower Snake-Asotin
502	WA	Asotin	West-Clark-Highland	3913	Lewiston			1%	72 / Lower Snake-Asotin
331	WA	Benton	Benton City	2090	Tri-Cities <sup>2</sup>			2%	75 / Lower Yakima
503	WA	Benton	Finley	376	Tri-Cities <sup>2</sup>			4%	80 / Middle Columbia-Lake Wallula
504	WA	Benton	Highland	3656	Tri-Cities <sup>2</sup>			3%	80 / Middle Columbia-Lake Wallula
332	WA	Benton	Kennewick	46960	Tri-Cities <sup>2</sup>			4%	135 / Upper Columbia-Priest Rapids
333	WA	Benton	Prosser	4630	Tri-Cities <sup>2</sup>			2%	75 / Lower Yakima
505	WA	Benton	Richland	35430	Tri-Cities <sup>2</sup>			3%	75 / Lower Yakima
506	WA	Benton	West Richland	3962	Tri-Cities <sup>2</sup>			2%	75 / Lower Yakima
334	WA	Chelan	Cashmere	2660	Wenatchee			48%	159 / Wenatchee
335	WA	Chelan	Chelan	3200	Wenatchee		Yes	31%	45 / Lake Chelan
336	WA	Chelan	Entiat	545	Wenatchee		Yes	32%	135 / Upper Columbia-Entiat
337	WA	Chelan	Leavenworth <sup>5</sup>	1692	Wenatchee		Yes	70%	159 / Wenatchee
507	WA	Chelan	Peshastin <sup>5</sup>	900	Wenatchee			65%	159 / Wenatchee
508	WA	Chelan	South Wenatchee	1207	Wenatchee			25%	135 / Upper Columbia-Entiat
509	WA	Chelan	Sunnyslope	1907	Wenatchee			33%	159 / Wenatchee
338	WA	Chelan	Wenatchee	23460	Wenatchee		Yes	29%	135 / Upper Columbia-Entiat
510	WA	Chelan	West Wenatchee	2220	Wenatchee			32%	159 / Wenatchee
339	WA	Columbia	Dayton	2505	Walla Walla			14%	155 / Walla Walla
340	WA	Columbia	Starbuck	165	Walla Walla			0%	73 / Lower Snake-Tucannon
341	WA	Douglas	Bridgeport	1705	Wenatchee			8%	20 / Chief Joseph
343	WA	Douglas	East Wenatchee	4010	Wenatchee			26%	135 / Upper Columbia-Entiat
511	WA	Douglas	East Wenatchee Bench	12539	Wenatchee			25%	135 / Upper Columbia-Entiat
345	WA	Douglas	Mansfield	365	Wenatchee			3%	20 / Chief Joseph
346	WA	Douglas	Rock Island	555	Wenatchee			13%	135 / Upper Columbia-Entiat
347	WA	Douglas	Waterville	1065	Wenatchee			19%	90 / Moses Coulee
348	WA	Ferry	Inchelium	392	Isolated	Yes		12%	30 / Franklin D. Roosevelt Lake
349	WA	Ferry	Republic	1080	Isolated		Yes	51%	111 / Sanpoil

350	WA	Franklin	Connell	2640	Tri-Cities <sup>2</sup>		2%	135 / Upper Columbia-Priest Rapids
351	WA	Franklin	Kahlotus	200	Isolated		0%	135 / Upper Columbia-Priest Rapids
352	WA	Franklin	Mesa	315	Tri-Cities <sup>2</sup>		3%	135 / Upper Columbia-Priest Rapids
353	WA	Franklin	Pasco	22170	Tri-Cities <sup>2</sup>		4%	135 / Upper Columbia-Priest Rapids
512	WA	Franklin	West Pasco	7312	Tri-Cities <sup>2</sup>		4%	135 / Upper Columbia-Priest Rapids
354	WA	Garfield	Pomeroy	1460	Lewiston	Yes	9%	73 / Lower Snake-Tucannon
513	WA	Grant	Cascade Valley	1001	Moses Lake		2%	57 / Lower Crab
355	WA	Grant	Coulee City	612	Isolated		3%	3 / Banks Lake
356	WA	Grant	Electric City	945	Isolated Trade Center	Yes	1%	3 / Banks Lake
357	WA	Grant	Ephrata	5585	Moses Lake		4%	57 / Lower Crab
358	WA	Grant	George	365	Moses Lake		4%	57 / Lower Crab
359	WA	Grant	Grand Coulee	1045	Isolated Trade Center	Yes	1%	30 / Franklin D. Roosevelt Lake
360	WA	Grant	Hartline	185	Moses Lake		2%	3 / Banks Lake
361	WA	Grant	Krupp	65	Moses Lake		2%	136 / Upper Crab
362	WA	Grant	Mattawa	1535	Moses Lake		5%	135 / Upper Columbia-Priest Rapids
363	WA	Grant	Moses Lake	12190	Moses Lake		2%	57 / Lower Crab
514	WA	Grant	Moses Lake North	3677	Moses Lake		2%	57 / Lower Crab
364	WA	Grant	Quincy	3860	Moses Lake		5%	57 / Lower Crab
365	WA	Grant	Royal City	1200	Moses Lake		4%	57 / Lower Crab
366	WA	Grant	Soap Lake	1300	Moses Lake		4%	3 / Banks Lake
367	WA	Grant	Warden	1765	Moses Lake		0%	57 / Lower Crab
368	WA	Grant	Wilson Creek	224	Moses Lake		3%	136 / Upper Crab
369	WA	Kittitas	Cle Elum <sup>5</sup>	1785	Ellensburg	Yes	46%	154 / Upper Yakima
370	WA	Kittitas	Ellensburg	12860	Ellensburg		10%	154 / Upper Yakima
371	WA	Kittitas	Kittitas	1060	Ellensburg		5%	154 / Upper Yakima
515	WA	Kittitas	Ronald <sup>5</sup>		Ellensburg		50%	154 / Upper Yakima
372	WA	Kittitas	Roslyn <sup>5</sup>	885	Ellensburg		49%	154 / Upper Yakima
516	WA	Kittitas	South Cle Elum <sup>5</sup>	457	Ellensburg		46%	154 / Upper Yakima
373	WA	Klickitat	Bingen <sup>5</sup>	660	The Dalles		19%	79 / Middle Columbia-Hood
374	WA	Klickitat	Goldendale	3425	The Dalles		2%	43 / Klickitat
517	WA	Klickitat	Klickitat <sup>5</sup>	820	The Dalles		1%	43 / Klickitat
375	WA	Klickitat	White Salmon <sup>5</sup>	1915	The Dalles		19%	79 / Middle Columbia-Hood
376	WA	Lincoln	Almira	315	Isolated		2%	136 / Upper Crab
377	WA	Lincoln	Creston	239	Isolated		0%	136 / Upper Crab
378	WA	Lincoln	Davenport	1550	Spokane		0%	30 / Franklin D. Roosevelt Lake
379	WA	Lincoln	Harrington	492	Isolated		0%	136 / Upper Crab
380	WA	Lincoln	Odessa	957	Moses Lake		1%	136 / Upper Crab
381	WA	Lincoln	Reardan	497	Spokane		0%	74 / Lower Spokane
382	WA	Lincoln	Sprague	465	Isolated		0%	100 / Palouse
383	WA	Lincoln	Wilbur	875	Isolated		1%	136 / Upper Crab
384	WA	Okanogan	Brewster	1645	Isolated Trade Center	Yes	19%	20 / Chief Joseph
385	WA	Okanogan	Conconully	180	Isolated		33%	97 / Okanogan
342	WA	Okanogan	Coulee Dam	206	Isolated Trade Center	Yes	1%	20 / Chief Joseph
344	WA	Okanogan	Elmer City	310	Isolated Trade Center	Yes	1%	20 / Chief Joseph
386	WA	Okanogan	Nespelem	225	Isolated	Yes	0%	20 / Chief Joseph
518	WA	Okanogan	Nesplem Community	291	Isolated	Yes	0%	20 / Chief Joseph
519	WA	Okanogan	North Omak	515	Isolated		11%	97 / Okanogan
387	WA	Okanogan	Okanogan	2400	Isolated Trade Center	Yes	14%	97 / Okanogan
388	WA	Okanogan	Omak	4220	Isolated Trade Center	Yes	14%	97 / Okanogan
389	WA	Okanogan	Oroville	1520	Isolated		13%	97 / Okanogan
390	WA	Okanogan	Pateros	585	Isolated		28%	20 / Chief Joseph



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Population 1992 <sup>3</sup>	Isolated Community or City Circle Association	Associated w/American Indian Reservation	FS or BLM Office	% of FS or BLM land within 20-mile Radius	Subbasin Number / Name <sup>4</sup>
391	WA	Okanogan	Riverside	250	Isolated			16%	97 / Okanogan
392	WA	Okanogan	Tonasket	1020	Isolated		Yes	19%	97 / Okanogan
393	WA	Okanogan	Twisp	910	Isolated		Yes	64%	77 / Methow
394	WA	Okanogan	Winthrop	345	Isolated		Yes	77%	77 / Methow
395	WA	Pend Oreille	Cusick	256	Isolated	Yes		40%	102 / Pend Oreille
396	WA	Pend Oreille	Ione	501	Isolated			61%	102 / Pend Oreille
397	WA	Pend Oreille	Metaline	193	Isolated			54%	102 / Pend Oreille
398	WA	Pend Oreille	Metaline Falls	227	Isolated		Yes	54%	102 / Pend Oreille
399	WA	Pend Oreille	Newport	1780	Spokane		Yes	21%	102 / Pend Oreille
520	WA	Pend Oreille	Usk		Isolated	Yes		38%	102 / Pend Oreille
521	WA	Skamania	Home Valley <sup>5</sup>		Isolated			22%	79 / Middle Columbia-Hood
400	WA	Spokane	Airway Heights	2520	Spokane			0%	74 / Lower Spokane
401	WA	Spokane	Cheney	8220	Spokane			0%	36 / Hangman
402	WA	Spokane	Country Homes	5126	Spokane			0%	51 / Little Spokane
403	WA	Spokane	Deerpark	2570	Spokane			1%	51 / Little Spokane
522	WA	Spokane	Dishman	9671	Spokane			0%	153 / Upper Spokane
404	WA	Spokane	Fairchild	4854	Spokane			0%	74 / Lower Spokane
405	WA	Spokane	Fairfield	599	Spokane			0%	36 / Hangman
524	WA	Spokane	Fairwood	5807	Spokane			0%	74 / Lower Spokane
406	WA	Spokane	Greenacres	4626	Spokane			0%	153 / Upper Spokane
407	WA	Spokane	Latah	211	Spokane			0%	36 / Hangman
408	WA	Spokane	Liberty Lake	2036	Spokane			2%	153 / Upper Spokane
409	WA	Spokane	Medical Lake	3660	Spokane			0%	74 / Lower Spokane
525	WA	Spokane	Millwood	1559	Spokane			0%	153 / Upper Spokane
410	WA	Spokane	Opportunity	22326	Spokane			0%	153 / Upper Spokane
411	WA	Spokane	Otis Orchards	5790	Spokane			2%	153 / Upper Spokane
412	WA	Spokane	Rockford	505	Spokane			0%	36 / Hangman
413	WA	Spokane	Spangle	245	Spokane			0%	36 / Hangman
414	WA	Spokane	Spokane	177196	Spokane		Yes	0%	153 / Upper Spokane
526	WA	Spokane	Town and Country	4921	Spokane			0%	51 / Little Spokane
527	WA	Spokane	Trentwood	4060	Spokane			0%	153 / Upper Spokane
415	WA	Spokane	Veradale	7836	Spokane			0%	153 / Upper Spokane
416	WA	Spokane	Waverly	111	Spokane			0%	36 / Hangman
417	WA	Stevens	Chewelah	2243	Isolated Trade Center			17%	23 / Colville
418	WA	Stevens	Colville	4440	Isolated Trade Center		Yes	24%	23 / Colville
419	WA	Stevens	Kettle Falls	1435	Isolated		Yes	32%	30 / Franklin D. Roosevelt Lake
420	WA	Stevens	Marcus	154	Isolated			38%	30 / Franklin D. Roosevelt Lake
421	WA	Stevens	Northport	342	Isolated			26%	30 / Franklin D. Roosevelt Lake
422	WA	Stevens	Springdale	355	Spokane			5%	23 / Colville
423	WA	Walla Walla	Burbank	1695	Tri-Cities <sup>2</sup>			4%	80 / Middle Columbia-Lake Wallula

424	WA	Walla Walla	College Place	6710	Tri-Cities <sup>2</sup>		4%	155 / Walla Walla
528	WA	Walla Walla	Garrett	1004	Tri-Cities <sup>2</sup>		3%	155 / Walla Walla
425	WA	Walla Walla	Prescott	305	Tri-Cities <sup>2</sup>		0%	155 / Walla Wall
426	WA	Walla Walla	Waitsburg	1130	Tri-Cities <sup>2</sup>		6%	155 / Walla Walla
427	WA	Walla Walla	Walla Walla	28730	Walla Walla	Yes	6%	155 / Walla Walla
529	WA	Walla Walla	Walla Walla East	2959	Walla Walla		9%	155 / Walla Walla
530	WA	Walla Walla	Wallula		Tri-Cities <sup>2</sup>		2%	80 / Middle Columbia-Lake Wallula
456	WA	Whitman	Albion	655	Pullman		0%	100 / Palouse
428	WA	Whitman	Colfax	2810	Pullman		0%	100/ Palouse
531	WA	Whitman	Colton	350	Pullman		0%	100 / Palouse
429	WA	Whitman	Endicott	360	Pullman		0%	100 / Palouse
532	WA	Whitman	Farmington	130	Isolated		4%	108 / Rock
533	WA	Whitman	Garfield	594	Pullman		2%	100 / Palouse
534	WA	Whitman	La Crosse	390	Isolated		0%	100 / Palouse
535	WA	Whitman	Lamont	93	Isolated		0%	108 / Rock
536	WA	Whitman	Malden	215	Spokane		0%	108 / Rock
537	WA	Whitman	Oakesdale	433	Isolated		0%	108 / Rock
430	WA	Whitman	Palouse	960	Pullman		2%	100 / Palouse
538	WA	Whitman	Pullman	23770	Pullman		0%	100 / Palouse
431	WA	Whitman	Rosalia	620	Spokane		0%	108 / Rock
432	WA	Whitman	St. John	508	Isolated		0%	108 / Rock
433	WA	Whitman	Tekoa	870	Isolated	Yes	1%	36 / Hangman
539	WA	Whitman	Uniontown	305	Pullman		0%	100 / Palouse
540	WA	Yakima	Fairview-Sumach	2749	Spokane		2%	75 / Lower Yakima
541	WA	Yakima	Fruitvale	4125	Yakima		2%	92 / Naches
434	WA	Yakima	Grandview	7690	Yakima		2%	75 / Lower Yakima
435	WA	Yakima	Granger	2085	Yakima	Yes	3%	75 / Lower Yakima
436	WA	Yakima	Harrah	453	Yakima	Yes	1%	75 / Lower Yakima
437	WA	Yakima	Mabton	1615	Yakima	Yes	2%	75 / Lower Yakima
438	WA	Yakima	Moxee	925	Yakima		2%	75 / Lower Yakima
439	WA	Yakima	Naches	689	Yakima		11%	92 / Naches
542	WA	Yakima	Satus	1343	Yakima	Yes	2%	75 / Lower Yakima
440	WA	Yakima	Selah	5170	Yakima		2%	154 / Upper Yakima
441	WA	Yakima	South Broadway	2843	Yakima		2%	75 / Lower Yakima
442	WA	Yakima	Sunnyside	11660	Yakima		3%	75 / Lower Yakima
443	WA	Yakima	Terrace Heights	4223	Yakima		2%	75 / Lower Yakima
444	WA	Yakima	Tieton	891	Yakima		15%	92 / Naches
445	WA	Yakima	Toppenish	7734	Yakima	Yes	3%	75 / Lower Yakima
446	WA	Yakima	Union Gap	3220	Yakima	Yes	2%	75 / Lower Yakima
447	WA	Yakima	Wapato	3790	Yakima	Yes	2%	75 / Lower Yakima
543	WA	Yakima	West Valley	6594	Yakima		3%	75 / Lower Yakima
448	WA	Yakima	White Swan	2755	Yakima	Yes	0%	75 / Lower Yakima
449	WA	Yakima	Yakima	59740	Yakima		2%	92 / Naches
450	WA	Yakima	Zillah	2190	Yakima	Yes	3%	75 / Lower Yakima
451	WY	Lincoln	Afton <sup>5</sup>	1534	Isolated		67%	Salt
452	WY	Lincoln	Alpine <sup>5</sup>	222	Isolated		85%	Greys-Hobock
453	WY	Lincoln	Thayne <sup>5</sup>	288	Isolated		75%	Salt
454	WY	Teton	Jackson <sup>5</sup>	5605	Isolated Trade Center		77%	Greys-Hobock
544	WY	Teton	Rafter J Ranch <sup>5</sup>	1092	Isolated		80%	Greys-Hobock



Table 5. Selected Attributes for 543 Communities in the Interior Columbia Basin (1995).<sup>1</sup> (continued)

Abbreviations used in this Table:  
BLM - Bureau of Land Management  
FS - Forest Service

<sup>1</sup> The set of 543 communities does not include all communities in the interior Columbia Basin due to limitations in the data available; therefore some communities are not listed in the tables.

<sup>2</sup> Community Location Numbers used for identification/mapping purposes only.

<sup>3</sup> Population figures for some communities were not collected in time to be included in this table.

<sup>4</sup> A map of the Subbasins is attached at the end of this appendix.

<sup>5</sup> This was in the original Columbia River Basin Assessment area, and was included in the Reyna (1998) report, but is no longer within the Interior Columbia Basin Project area covered by this SDEIS.

<sup>6</sup> Tri-Cities refers to the cities of Pasco, Richland, and Kennewick located in Washington State.

Source: Reyna 1998.

**Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup>**

Place No. <sup>2</sup>	State	County	Town	Agricult. <sup>3</sup>	Agricult. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood Products Mfg. <sup>3</sup>	Other Mfg. <sup>3</sup>	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance, Insurance, R.Estate <sup>3</sup>	Services <sup>3</sup>	Federal Govt. <sup>3</sup>	Local Govt. <sup>3</sup>
1	ID	Ada	Boise	not	not	not	low	not	not	not	not	low	low	not	low
2	ID	Ada	Eagle	low	not	not	med	not	not	not	not	low	low	not	not
3	ID	Ada	Garden City	very high	not	not	not	not	not	not	not	not	not	not	not
4	ID	Ada	Kuna	low	low	not	med	not	not	low	not	not	not	not	med
5	ID	Ada	Meridian	not	not	not	med	low	not	low	not	not	low	not	not
6	ID	Adams	Council	low	not	med	not	not	not	med	not	low	low	high	not
7	ID	Adams	Indian Valley	very high	not	not	not	not	not	not	not	not	not	not	not
8	ID	Adams	New Meadows	not	low	not	low	very high	not	not	not	not	not	high	med
9	ID	Bannock	Arimo	med	not	not	not	not	not	not	not	not	not	not	very high
10	ID	Bannock	Chubbuck	med	not	not	not	not	not	not	low	low	not	not	not
11	ID	Bannock	Downey	low	not	not	not	not	not	not	low	low	not	not	med
12	ID	Bannock	Fort Hall	not	high	not	not	not	not	not	not	not	not	very high	not
13	ID	Bannock	Inkom	not	not	not	low	med	med	low	not	low	not	not	med
14	ID	Bannock	Lava Hot Springs	not	not	not	not	low	not	high	not	low	low	not	not
15	ID	Bannock	McCammon	very high	low	not	not	not	not	low	not	not	low	not	not
16	ID	Bannock	Pocatello	not	not	not	not	not	not	med	not	low	not	not	low
25	ID	Benewah	Parkline	very high	very high	not	not	not	not	not	not	not	not	not	not
26	ID	Benewah	Plummer	med	med	not	low	very high	not	not	not	not	not	high	not
27	ID	Benewah	St. Maries	not	low	not	not	very high	not	low	not	not	not	not	low
28	ID	Benewah	Tensed	very high	very high	not	not	not	not	not	not	not	not	low	not
29	ID	Bingham	Aberdeen	not	not	not	not	not	low	not	not	not	not	med	not
60	ID	Bingham	Atomic City	very high	not	not	not	not	not	not	not	not	not	not	not
30	ID	Bingham	Basalt	not	very high	not	not	not	not	very high	not	not	not	high	not
31	ID	Bingham	Blackfoot	not	not	low	not	not	not	not	low	not	low	not	low
32	ID	Bingham	Firth	high	not	not	not	not	very high	not	not	not	not	not	not
33	ID	Bingham	Shelley	low	not	not	low	not	med	not	not	low	not	not	not
34	ID	Blaine	Bellevue	not	not	very high	med	very high	not	not	not	low	low	not	low
35	ID	Blaine	Hailey	not	not	low	med	not	not	not	not	low	low	not	low
36	ID	Blaine	Ketchum	not	not	not	low	not	not	not	not	med	med	not	not



[illegible]

67	ID	Canyon	Middleton	high	high	not	med	not	not	not	not	not	not	not	not	not
68	ID	Canyon	Nampa	not	low	not	low	low	low	not	low	not	low	not	not	not
69	ID	Canyon	Notus	very high	not	not	not	not	not	low	low	not	not	not	not	med
70	ID	Canyon	Parma	very high	low	not	not	not	not	low	not	not	not	not	not	not
71	ID	Canyon	Wilder	high	low	not	not	not	low	not	not	not	not	not	low	low
74	ID	Cassia	Burley	not	not	not	not	low	low	not	low	low	low	low	low	low
75	ID	Cassia	Declo	med	low	not	not	not	not	not	low	not	not	not	not	not
76	ID	Cassia	Malta	not	not	not	not	not	not	not	high	not	not	not	not	not
77	ID	Cassia	Oakley	low	low	very high	not	not	not	high	low	not	not	not	not	not
78	ID	Clark	Dubois	high	med	low	high	not	not	not	not	not	not	not	low	low
79	ID	Clearwater	Elk River	very high	not	not	low	low	not	not	not	not	not	not	low	not
80	ID	Clearwater	Orofino	low	not	not	not	high	not	low	not	not	not	not	med	low
81	ID	Clearwater	Pierce	not	not	not	not	very high	not	not	not	not	not	not	not	not
82	ID	Clearwater	Weippe	med	not	not	not	very high	not	not	not	not	not	not	not	low
83	ID	Custer	Challis	med	not	very high	not	low	not	low	not	not	not	not	low	low
84	ID	Custer	Clayton	low	not	not	not	not	not	not	low	not	not	not	very high	not
150	ID	Custer	Ellis	not	high	not	not	not	not	not	not	not	not	not	very high	not
85	ID	Custer	Mackay	med	low	not	low	not	not	low	not	not	not	not	high	not
86	ID	Custer	Stanley	not	not	not	not	not	not	not	not	not	not	med	not	low
87	ID	Elmore	Glenns Ferry	med	not	not	not	not	not	not	not	not	not	not	very high	low
88	ID	Elmore	Mountain Home	low	not	not	not	not	not	not	not	not	not	not	very high	not
89	ID	Franklin	Clifton <sup>4</sup>	not	not	not	not	not	not	not	not	not	not	high	not	not
90	ID	Franklin	Dayton <sup>4</sup>	high	not	not	low	not	not	not	not	not	not	not	not	med
91	ID	Franklin	Franklin <sup>4</sup>	not	not	very high	high	not	not	not	not	high	low	not	not	not
92	ID	Franklin	Preston <sup>4</sup>	low	not	low	not	not	not	low	low	not	not	not	low	low
93	ID	Franklin	Weston <sup>4</sup>	very high	not	not	not	not	not	not	not	not	not	not	not	not
94	ID	Fremont	Ashton	low	med	not	not	very high	not	not	not	not	not	not	not	not
95	ID	Fremont	Drummond	very high	not	not	not	not	not	not	not	not	not	not	not	not
96	ID	Fremont	Island Park	not	not	not	low	not	not	not	not	not	not	not	very high	med
97	ID	Fremont	Newdale	very high	not	not	not	not	not	not	not	not	not	not	not	med
98	ID	Fremont	Parker	high	not	not	not	not	not	not	low	not	not	not	not	high
99	ID	Fremont	St. Anthony	med	low	not	not	very high	not	med	low	not	not	not	not	low
100	ID	Fremont	Teton	very high	not	not	not	not	not	not	not	not	not	not	not	not
101	ID	Gem	Emmett	low	low	not	low	very high	not	not	not	not	not	not	not	low
102	ID	Gem	Letha	very high	not	not	not	not	not	not	not	not	not	not	not	not



Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Agricult. <sup>3</sup>	Agricult. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood	Other Mfg. <sup>3</sup>	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance		Federal Govt. <sup>3</sup>	Local Govt. <sup>3</sup>
								Products Mfg. <sup>3</sup>				Insurance, R.Estate <sup>3</sup>	Services <sup>3</sup>		
103	ID	Gem	Montour	very high	not	not	not	very high	not	not	not	not	not	not	not
104	ID	Gem	Ola	high	not	not	not	not	not	not	not	not	not	not	high
105	ID	Gem	Sweet	very high	very high	not	not	high	not	not	not	not	not	not	not
106	ID	Gooding	Bliss	med	not	low	not	med	not	low	low	not	not	not	low
107	ID	Gooding	Gooding	not	not	not	not	not	not	low	not	not	low	high	med
108	ID	Gooding	Hagerman	low	med	not	not	not	not	low	not	not	not	very high	not
109	ID	Gooding	Wendell	med	med	not	low	not	not	low	not	not	not	not	not
110	ID	Idaho	Cottonwood	high	not	high	low	low	not	low	not	low	not	not	low
111	ID	Idaho	Elk City	very high	not	not	not	very high	not	not	not	not	not	high	not
113	ID	Idaho	Grangeville	med	not	med	low	med	not	med	not	not	not	med	not
114	ID	Idaho	Kooskia	very high	not	not	not	very high	not	not	not	not	not	not	not
115	ID	Idaho	Riggins	high	not	very high	low	low	not	not	not	not	low	med	not
116	ID	Idaho	White Bird	very high	not	not	not	high	not	not	not	not	not	very high	not
117	ID	Jefferson	Hamer	very high	not	not	not	not	not	not	not	not	not	not	not
118	ID	Jefferson	Lewisville	high	not	not	med	not	med	not	not	not	not	not	not
119	ID	Jefferson	Menan	high	very high	not	low	not	not	not	not	not	not	not	not
120	ID	Jefferson	Mudlake	med	not	not	not	not	not	not	low	not	not	med	med
121	ID	Jefferson	Rigby	not	very high	not	low	not	not	low	not	not	not	not	low
122	ID	Jefferson	Ririe	med	not	not	not	not	med	not	not	not	not	not	low
123	ID	Jefferson	Roberts	high	not	not	high	not	not	low	not	not	not	not	med
124	ID	Jerome	Eden	high	not	not	low	not	not	high	not	not	not	not	not
125	ID	Jerome	Hazelton	high	not	not	not	not	not	low	not	low	not	not	low
126	ID	Jerome	Jerome	low	low	not	not	not	not	low	not	not	not	low	low
127	ID	Kootenai	Athol	not	not	not	low	high	not	med	not	not	low	low	low
128	ID	Kootenai	Coeur d'Alene	not	low	low	low	low	not	not	not	low	low	not	low
130	ID	Kootenai	Fernan Lake	not	very high	not	not	very high	not	not	not	not	not	not	not
131	ID	Kootenai	Harrison	very high	not	not	med	not	not	not	not	not	low	not	not
132	ID	Kootenai	Hauser	not	not	not	very high	not	not	not	high	not	not	not	not
133	ID	Kootenai	Hayden	not	not	not	very high	very high	not	not	not	not	not	not	not

134	ID	Kootenai	Hayden Lake	not	high	not	not	not	not	low	low	low	low	not	not
135	ID	Kootenai	Huetter	not	not	not	not	very high	not	not	not	not	not	not	not
136	ID	Kootenai	Post Falls	not	low	not	med	not	not	low	low	low	low	not	not
137	ID	Kootenai	Rathdrum	not	high	not	high	med	not	not	not	not	not	not	not
138	ID	Kootenai	Spirit Lake	not	low	not	low	not	not	low	not	not	low	low	med
139	ID	Kootenai	Worley	very high	low	not	not	not	not	not	not	not	not	high	not
143	ID	Lemhi	Carmen	high	not	not	med	not	not	not	not	not	not	not	med
144	ID	Lemhi	Gibbonville	not	not	not	very high	not	not	not	not	not	low	not	not
145	ID	Lemhi	Leadore	very high	not	not	low	not	not	not	not	not	not	not	low
146	ID	Lemhi	Lemhi	very high	not	not	not	not	not	not	not	not	not	not	low
147	ID	Lemhi	May	very high	not	not	not	not	not	not	not	not	not	not	med
148	ID	Lemhi	Salmon	low	low	low	low	very high	not	low	not	low	not	med	low
149	ID	Lemhi	Tendoy	not	not	not	not	not	not	not	high	not	not	not	not
151	ID	Lewis	Craigmont	very high	not	not	not	not	not	low	not	not	not	not	not
152	ID	Lewis	Kamiah	low	not	not	low	very high	not	low	not	not	not	not	low
153	ID	Lewis	Nez Perce	very high	not	not	not	not	not	low	not	not	not	not	not
155	ID	Lincoln	Dietrich	med	not	not	not	not	not	not	not	not	not	not	high
156	ID	Lincoln	Richfield	high	not	not	not	not	low	not	not	not	not	not	not
157	ID	Lincoln	Shoshone	low	low	not	not	not	not	not	not	not	not	high	med
158	ID	Madison	Rexburg	not	low	not	not	med	low	not	not	not	low	not	not
159	ID	Madison	Sugar City	very high	not	not	not	not	not	low	low	not	not	not	not
160	ID	Minidoka	Acequia	high	not	not	not	not	not	not	not	not	not	not	high
161	ID	Minidoka	Heyburn	high	not	not	low	not	not	not	not	not	not	not	not
162	ID	Minidoka	Minidoka	med	not	not	not	not	med	not	not	not	not	not	med
163	ID	Minidoka	Paul	low	med	not	not	not	not	not	not	not	not	not	low
164	ID	Minidoka	Rupert	not	low	not	not	not	med	not	not	not	not	low	low
165	ID	Nez Perce	Culdesac	very high	very high	not	not	not	not	not	low	not	not	not	low
166	ID	Nez Perce	Lapwai	high	not	not	not	not	not	not	not	not	not	very high	low
167	ID	Nez Perce	Lenore	very high	not	not	low	not	not	not	not	not	not	high	not
168	ID	Nez Perce	Lewiston	not	not	not	low	high	not	low	not	not	low	not	not
169	ID	Nez Perce	Peck	med	not	not	low	not	low	med	not	low	not	not	low
170	ID	Nez Perce	Spalding	not	not	not	not	not	not	not	not	not	not	very high	not
173	ID	Owyhee	Grand View	very high	not	not	not	not	not	not	not	not	not	low	low
174	ID	Owyhee	Homedale	low	not	very high	low	not	not	med	not	not	low	not	low
175	ID	Owyhee	Marsing	very high	very high	not	not	not	not	not	not	not	not	low	low
176	ID	Payette	Fruitland	med	not	not	not	very high	not	low	not	not	not	not	not



Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Agricult. <sup>3</sup>	Agricult. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood	Other <sup>3</sup> Mfg.	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance		Federal <sup>3</sup> Govt.	Local <sup>3</sup> Govt.
								Products <sup>3</sup> Mfg.				Insurance, <sup>3</sup> R.Estate	Services <sup>3</sup>		
177	ID	Payette	New Plymouth	very high	high	not	not	not	not	low	not	not	not	not	not
178	ID	Payette	Payette	not	low	low	not	high	not	med	not	not	not	not	low
179	ID	Power	American Falls	low	not	not	not	not	high	low	not	not	not	not	not
180	ID	Power	Arbon Valley	very high	not	not	not	not	not	not	not	not	not	not	med
181	ID	Power	Rockland	very high	very high	not	not	not	not	low	not	not	not	not	med
182	ID	Shoshone	Kellogg	not	not	very high	low	not	not	low	not	not	low	not	not
183	ID	Shoshone	Mullan	not	not	very high	not	not	not	not	not	not	not	very high	not
184	ID	Shoshone	Osburn	not	not	not	med	med	not	low	not	low	not	not	low
185	ID	Shoshone	Pinehurst	not	not	not	med	high	not	med	low	not	not	not	low
186	ID	Shoshone	Smelterville	not	not	not	not	not	not	not	low	not	low	not	low
187	ID	Shoshone	Wallace	not	not	very high	not	not	not	not	not	not	not	low	med
188	ID	Shoshone	Wardner	very high	not	not	not	not	not	not	not	not	not	not	not
189	ID	Teton	Driggs	low	low	not	low	very high	not	not	not	not	not	low	low
190	ID	Teton	Tetonia	very high	high	not	low	very high	not	low	not	not	not	not	not
191	ID	Teton	Victor	very high	not	not	not	very high	not	not	not	not	not	low	not
192	ID	Twin Falls	Buhl	not	low	not	not	not	med	not	not	not	not	not	not
193	ID	Twin Falls	Castleford	med	not	very high	not	not	not	high	not	not	not	not	high
194	ID	Twin Falls	Filer	low	med	very high	low	very high	not	not	not	not	not	not	low
195	ID	Twin Falls	Hansen	not	not	very high	not	med	not	not	low	not	not	not	high
196	ID	Twin Falls	Hollister	very high	not	very high	not	not	not	not	not	not	not	not	not
197	ID	Twin Falls	Kimberly	low	not	med	low	not	not	low	low	not	not	not	not
198	ID	Twin Falls	Murtaugh	med	not	very high	not	not	not	high	not	not	not	not	low
199	ID	Twin Falls	Twin Falls	not	not	not	low	low	not	low	low	low	low	low	low
200	ID	Valley	Cascade	not	low	not	not	high	not	not	not	not	not	high	med
201	ID	Valley	Donnelly	not	not	not	high	not	not	not	not	low	low	not	not
202	ID	Valley	Lakefork	med	not	not	very high	not	not	not	not	not	not	not	high
203	ID	Valley	McCall	not	not	very high	med	not	not	not	not	low	low	not	not
204	ID	Valley	Smiths Ferry	high	not	not	not	not	not	not	not	not	high	not	not
205	ID	Washington	Cambridge	high	not	not	not	very high	not	med	not	not	not	not	low

206	ID	Washington	Midvale	high	not	not	not	not	high	not	not	not	not	not	not
207	ID	Washington	Weiser	med	high	not	not	not	not	not	not	not	not	not	low
208	MT	Deer Lodge	Anaconda	low	not	low	not	not	not	not	not	not	low	not	low
209	MT	Flathead	Columbia Falls	not	not	not	not	med	low	not	not	not	low	not	not
210	MT	Flathead	Kalispell	not	not	not	low	low	not	not	not	low	low	not	not
211	MT	Flathead	Whitefish	not	low	not	low	low	not	low	not	low	low	not	not
212	MT	Granite	Drummond	very high	high	not	not	very high	not	not	not	not	not	not	low
213	MT	Granite	Philipsburg	very high	high	not	not	high	not	not	not	not	not	low	not
214	MT	Lake	Arlee	not	low	not	low	not	not	not	low	not	low	low	low
215	MT	Lake	Charlo	very high	not	not	not	not	not	not	not	not	not	not	med
216	MT	Lake	Finley Point	high	not	not	not	not	med	very high	not	not	not	not	not
218	MT	Lake	Pablo	not	not	not	not	high	not	not	not	not	low	not	med
219	MT	Lake	Polson	not	low	not	low	not	not	not	not	low	low	not	not
220	MT	Lake	Ronan	low	not	not	not	not	not	low	not	not	low	not	low
221	MT	Lake	St. Ignatius	very high	not	low	not	not	not	not	not	not	low	low	not
222	MT	Lincoln	Eureka	not	not	not	not	high	low	not	not	not	not	high	low
223	MT	Lincoln	Libby	not	not	not	not	low	not	not	not	not	low	low	low
224	MT	Lincoln	Rexford	low	very high	not	not	very high	not	not	not	not	not	not	not
455	MT	Lincoln	Troy	not	high	not	low	low	not	not	not	not	not	med	low
225	MT	Mineral	Alberton	not	not	not	not	low	not	not	not	not	low	not	low
226	MT	Mineral	Superior	not	low	not	not	high	not	not	not	not	not	low	low
227	MT	Missoula	Bonnor-W.	low	not	not	not	very high	not	not	not	not	not	not	low
228	MT	Missoula	Lolo	not	not	not	low	not	not	low	not	not	low	not	low
229	MT	Missoula	Missoula	not	not	not	not	low	not	low	not	low	low	not	low
230	MT	Missoula	Orchard Homes	very high	med	very high	not	not	not	not	not	not	not	not	not
231	MT	Powell	Deer Lodge	not	low	high	not	med	low	not	not	not	not	low	low
232	MT	Ravalli	Darby	low	not	not	not	very high	not	not	not	not	not	med	not
233	MT	Ravalli	Hamilton	low	low	low	low	not	not	not	not	low	low	not	low
234	MT	Ravalli	Pinesdale	not	not	not	high	not	low	not	low	not	not	not	high
235	MT	Ravalli	Stevensville	high	low	not	low	not	not	low	not	not	not	med	not
236	MT	Sanders	Hot Springs	low	high	not	not	not	not	not	low	not	low	not	low
237	MT	Sanders	Plains	very high	low	not	not	not	not	not	not	not	not	high	not
238	MT	Sanders	Thompson Falls	not	not	low	not	high	not	low	not	not	not	not	low
239	MT	Silver Bow	Butte	very high	very high	not	not	not	not	not	not	not	not	not	not
240	MT	Silver Bow	Walkerville	not	not	not	not	not	not	not	not	not	med	not	not
243	OR	Baker	Richland	not	not	not	low	not	not	not	not	not	med	not	low



Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Agric. <sup>3</sup>	Agric. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood	Other Mfg. <sup>3</sup>	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance		Federal Govt. <sup>3</sup>	Local Govt. <sup>3</sup>
								Products Mfg. <sup>3</sup>				Insurance, R.Estate <sup>3</sup>	Services <sup>3</sup>		
246	OR	Crook	Prineville	low	low	not	not	high	not	low	not	not	not	low	not
247	OR	Deschutes	Bend	not	not	not	low	low	not	not	low	low	low	not	not
248	OR	Deschutes	Redmond	not	not	not	low	low	not	low	low	low	low	not	not
249	OR	Deschutes	Sisters	not	low	not	med	not	not	not	low	low	low	not	not
250	OR	Deschutes	Terrebonne	not	high	not	med	not	not	low	low	low	not	not	not
251	OR	Deschutes	Three Rivers	very high	very high	not	not	not	not	not	not	not	not	not	not
252	OR	Gilliam	Arlington	med	not	not	not	med	not	low	low	not	not	not	low
253	OR	Gilliam	Condon	med	not	not	not	not	not	very high	not	not	not	not	low
254	OR	Gilliam	Lonerock	very high	not	not	not	not	not	not	not	not	low	not	not
255	OR	Grant	Canyon City	low	not	not	low	not	not	not	not	not	low	not	high
256	OR	Grant	Dayville	low	not	not	low	med	not	not	not	not	not	very high	low
257	OR	Grant	Granite	not	not	not	not	not	not	very high	not	not	not	not	not
258	OR	Grant	John Day	not	not	not	not	very high	not	not	not	not	not	high	not
259	OR	Grant	Long Creek	med	med	not	not	high	not	not	not	not	not	not	low
260	OR	Grant	Monument	high	low	not	not	not	not	not	not	not	low	not	not
261	OR	Grant	Mount Vernon	not	not	not	high	very high	not	not	not	not	not	not	low
262	OR	Grant	Prairie City	low	not	not	low	very high	not	not	not	low	not	high	not
263	OR	Grant	Seneca	not	high	not	not	low	not	very high	not	not	not	not	not
264	OR	Harney	Burns	med	low	not	not	high	not	not	not	not	not	not	low
265	OR	Harney	Hines	high	not	not	not	very high	not	not	not	not	not	high	not
267	OR	Jefferson	Culver	low	high	not	low	not	low	not	not	not	low	not	not
268	OR	Jefferson	Madras	low	not	not	low	low	not	not	low	not	not	not	low
269	OR	Jefferson	Metolius	not	not	not	not	not	very high	not	not	not	not	not	not
270	OR	Jefferson	Warm Springs	low	not	not	not	very high	not	not	not	not	not	med	not
271	OR	Klamath	Altamont	very high	not	not	not	not	not	not	not	not	not	not	not
272	OR	Klamath	Bonanza	very high	not	not	not	not	not	not	not	not	not	high	not
273	OR	Klamath	Chiloquin	not	high	not	not	not	not	not	low	not	not	low	not
274	OR	Klamath	Klamath Falls	not	not	not	low	not	not	low	low	low	low	not	low
275	OR	Klamath	Malin	low	not	not	not	very high	not	not	not	not	not	not	not

276	OR	Klamath	Merrill	low	not	not	not	med	not	low	not	not	not	low	low
278	OR	Lake	Lakeview	not	low	not	not	med	not	low	not	not	not	high	low
279	OR	Lake	Paisley	very high	not	not	not	low	not	not	not	not	not	low	not
277	OR	Lemhi	Northfork	not	not	not	not	not	not	not	not	not	high	not	not
280	OR	Malheur	Adrian	very high	not	very high	not	not	not	not	not	not	not	not	low
281	OR	Malheur	Jorden Valley	high	not	very high	not	not	not	not	not	not	not	med	high
282	OR	Malheur	Nyssa	med	very high	not	not	not	low	not	low	not	not	not	low
283	OR	Malheur	Ontario	med	not	not	not	not	low	low	low	not	not	high	not
284	OR	Malheur	Vale	high	very high	not	not	not	not	not	not	not	not	not	med
285	OR	Morrow	Boardman	low	high	not	not	not	low	not	not	not	not	low	not
286	OR	Morrow	Heppner	med	not	not	not	med	not	not	not	not	not	low	low
287	OR	Morrow	lone	low	not	not	not	not	not	not	low	high	low	not	high
288	OR	Morrow	Irrigon	not	not	not	low	not	med	not	not	not	not	not	low
289	OR	Morrow	Lexington	high	med	not	not	low	low	med	not	not	not	not	not
290	OR	Sherman	Grass Valley	very high	not	not	not	not	not	not	low	not	not	not	not
291	OR	Sherman	Moro	high	not	not	not	not	not	not	not	not	not	med	med
292	OR	Sherman	Rufus	med	not	not	not	not	not	not	low	not	not	very high	not
293	OR	Sherman	Wasco	med	low	not	not	not	not	not	low	not	low	not	not
294	OR	Umatilla	Adams	very high	not	not	not	not	not	med	not	not	not	low	not
295	OR	Umatilla	Athena	med	low	not	not	not	not	low	low	not	not	not	low
296	OR	Umatilla	Echo	med	not	not	not	low	not	not	not	not	not	med	med
297	OR	Umatilla	Helix	not	not	not	not	not	not	med	not	not	not	not	high
298	OR	Umatilla	Hermiston	not	low	not	not	not	low	low	low	not	not	not	not
299	OR	Umatilla	Milton-Freewater	not	not	not	not	not	low	not	low	not	not	not	not
300	OR	Umatilla	Pendleton	not	not	not	not	not	not	low	not	low	low	low	low
301	OR	Umatilla	Pilot Rock	low	not	not	not	very high	not	not	not	not	not	low	low
302	OR	Umatilla	Stanfield	med	not	not	not	not	not	not	not	not	not	not	med
303	OR	Umatilla	Ukiah	high	not	not	not	not	not	not	not	not	low	not	not
304	OR	Umatilla	Umatilla	med	not	not	not	not	not	low	not	not	not	low	low
305	OR	Umatilla	Weston	not	low	not	not	not	high	not	not	not	not	not	not
306	OR	Union	Cove	high	low	not	low	not	not	not	not	not	not	low	not
307	OR	Union	Elgin	low	not	not	not	very high	not	not	not	low	not	not	low
308	OR	Union	Imbler	not	very high	not	not	high	not	not	low	not	not	med	low
309	OR	Union	Island City	not	not	not	not	not	not	not	not	not	high	not	not
310	OR	Union	La Grande	not	not	not	not	med	not	low	low	low	low	not	low
311	OR	Union	North Powder	med	not	not	not	very high	not	not	not	not	not	low	low



[illegible]

341	WA	Douglas	Bridgeport	high	not	not	not	not	not	not	not	low	not	not	low
343	WA	Douglas	East Wenatchee	low	low	not	low	not	not	med	low	not	low	not	not
345	WA	Douglas	Mansfield	low	high	not	not	not	not	not	not	not	not	not	med
346	WA	Douglas	Rock Island	low	not	not	low	not	not	high	not	not	not	med	low
347	WA	Douglas	Waterville	high	not	not	not	not	not	not	not	low	not	low	not
348	WA	Ferry	Inchelium	not	not	not	not	high	not	not	not	not	not	very high	not
349	WA	Ferry	Republic	med	not	very high	not	high	not	not	not	not	not	not	low
350	WA	Franklin	Connell	med	med	not	not	not	low	not	not	low	not	not	not
351	WA	Franklin	Kahlotus	med	med	not	not	not	not	not	not	not	not	high	med
352	WA	Franklin	Mesa	med	high	not	not	not	not	not	not	not	not	not	low
353	WA	Franklin	Pasco	not	low	not	low	not	not	med	not	not	low	low	low
354	WA	Garfield	Pomeroy	very high	low	not	not	not	not	not	not	not	not	med	low
355	WA	Grant	Coulee City	low	med	not	not	not	not	not	not	low	not	not	med
356	WA	Grant	Electric City	not	not	not	not	not	not	not	not	not	low	not	high
357	WA	Grant	Ephrata	low	low	not	not	not	not	med	not	not	not	not	med
358	WA	Grant	George	very high	low	not	not	not	not	not	not	not	not	not	not
359	WA	Grant	Grand Coulee	not	not	not	not	not	not	not	low	not	low	not	low
360	WA	Grant	Hartline	very high	not	not	not	not	not	not	not	not	not	not	not
361	WA	Grant	Krupp	med	not	not	not	not	not	not	not	very high	not	not	not
362	WA	Grant	Mattawa	high	low	not	not	not	not	not	not	not	not	not	low
363	WA	Grant	Moses Lake	not	not	not	not	not	not	not	not	not	not	not	not
364	WA	Grant	Quincy	low	high	not	not	not	not	not	not	not	not	not	not
365	WA	Grant	Royal City	low	high	not	not	not	not	not	not	not	not	not	med
366	WA	Grant	Soap Lake	not	low	not	low	not	not	not	not	not	med	not	low
367	WA	Grant	Warden	med	med	not	not	not	not	low	not	not	not	not	not
368	WA	Grant	Wilson Creek	high	high	not	not	not	not	low	not	not	not	not	not
369	WA	Kittitas	Cle Elum <sup>4</sup>	not	not	low	not	med	not	not	not	low	low	low	low
370	WA	Kittitas	Ellensburg	not	not	not	not	low	not	low	not	not	low	not	med
371	WA	Kittitas	Kittitas	med	not	not	not	not	not	low	not	not	not	not	med
372	WA	Kittitas	Roslyn <sup>4</sup>	low	not	not	not	med	not	low	not	not	low	not	med
373	WA	Klickitat	Bingen <sup>4</sup>	low	not	not	not	high	not	med	not	not	not	med	low
374	WA	Klickitat	Goldendale	low	not	not	not	low	low	low	not	not	not	not	low
375	WA	Klickitat	White Salmon <sup>4</sup>	not	not	not	low	low	not	not	not	not	low	low	med
376	WA	Lincoln	Almira	very high	not	not	not	not	not	not	low	not	not	not	low
377	WA	Lincoln	Creston	very high	not	not	not	not	not	not	not	not	not	not	med
378	WA	Lincoln	Davenport	high	med	not	not	not	not	not	not	not	low	not	med



Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup> (continued)

Place No. <sup>2</sup>	State	County	Town	Agricult. <sup>3</sup>	Agricult. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood	Other Mfg. <sup>3</sup>	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance	Federal Govt. <sup>3</sup>	Local Govt. <sup>3</sup>
								Products Mfg. <sup>3</sup>				Insurance, R.Estate <sup>3</sup>		
379	WA	Lincoln	Harrington	very high	not	not	not	not	not	not	low	not	not	not
380	WA	Lincoln	Odessa	very high	low	not	not	not	not	not	not	low	not	low
381	WA	Lincoln	Reardan	high	not	not	not	not	not	not	low	not	not	low
382	WA	Lincoln	Sprague	very high	med	not	not	not	not	not	not	not	not	low
383	WA	Lincoln	Wilbur	high	med	not	low	not	not	not	low	low	not	low
384	WA	Okanogan	Brewster	not	high	very high	low	not	not	not	low	low	low	not
385	WA	Okanogan	Conconully	med	not	not	not	not	not	not	not	not	low	low
342	WA	Okanogan	Coulee Dam	not	not	not	not	high	not	low	not	low	not	high
344	WA	Okanogan	Elmer City	not	not	not	not	not	not	not	med	very high	not	low
386	WA	Okanogan	Nespelem	not	med	not	not	not	not	not	not	not	low	very high
387	WA	Okanogan	Okanogan	not	not	not	not	not	not	not	not	not	low	med
388	WA	Okanogan	Omak	low	not	med	not	very high	not	not	not	not	low	med
389	WA	Okanogan	Oroville	med	not	not	not	very high	not	not	low	not	not	low
390	WA	Okanogan	Pateros	not	low	not	not	very high	not	low	low	not	not	not
391	WA	Okanogan	Riverside	med	not	not	med	not	not	high	low	low	not	not
392	WA	Okanogan	Tonasket	med	low	not	not	not	not	not	not	not	low	low
393	WA	Okanogan	Twisp	low	med	not	not	high	not	low	low	low	not	low
394	WA	Okanogan	Winthrop	low	low	not	med	very high	not	not	low	low	not	high
395	WA	Pend Oreille	Cusick	not	not	not	med	med	not	med	not	not	not	med
396	WA	Pend Oreille	Ione	not	not	not	not	very high	not	low	not	not	low	not
397	WA	Pend Oreille	Metaline	not	not	not	not	not	not	not	med	not	not	not
398	WA	Pend Oreille	Metaline Falls	not	not	not	not	not	not	low	not	not	not	very high
399	WA	Pend Oreille	Newport	med	low	not	low	not	low	not	not	not	not	not
400	WA	Spokane	Airway Heights	not	not	not	not	not	not	not	not	not	low	not
401	WA	Spokane	Cheney	not	not	not	low	not	not	low	not	low	low	not
402	WA	Spokane	Country Homes	not	very high	not	not	not	not	not	not	not	med	high
403	WA	Spokane	Deerpark	low	low	not	med	not	not	low	low	low	low	not
404	WA	Spokane	Fairchild	not	not	not	not	not	not	not	not	not	not	very high
405	WA	Spokane	Fairfield	very high	not	not	not	not	not	low	not	low	not	not

406	WA	Spokane	Greenacres	not	not	not	not	not	not	not	not	not	not	not	not	not
407	WA	Spokane	Latah	very high	not	not	not	not	not	not	not	low	not	not	not	not
408	WA	Spokane	Liberty Lake	not	low	not	high	not	high	low	not	not	not	not	not	not
409	WA	Spokane	Medical Lake	not	low	not	not	not	low	not	not	not	low	med	low	low
410	WA	Spokane	Opportunity	very high	med	not	not	not	low	not	not	not	not	high	not	not
411	WA	Spokane	Otis Orchards	not	high	not	high	not	not	not	not	not	low	not	not	not
412	WA	Spokane	Rockford	very high	not	not	not	not	not	med	not	not	not	not	not	low
413	WA	Spokane	Spangle	very high	not	not	not	not	not	not	not	low	not	not	not	med
414	WA	Spokane	Spokane	not	not	not	not	not	not	not	not	not	not	not	not	not
415	WA	Spokane	Veradale	not	low	not	low	not	not	low	low	low	low	low	not	not
416	WA	Spokane	Waverly	very high	not	not	not	not	med	not	not	not	not	not	not	not
417	WA	Stevens	Chewelah	high	low	not	low	med	not	not	not	not	low	not	not	not
418	WA	Stevens	Colville	low	low	not	not	med	not	not	not	not	low	low	low	low
419	WA	Stevens	Kettle Falls	low	not	not	not	very high	not	low	not	not	not	low	not	not
420	WA	Stevens	Marcus	not	not	not	not	not	not	not	med	not	low	low	low	not
421	WA	Stevens	Northport	high	not	very high	not	very high	not	not	not	not	not	high	not	not
422	WA	Stevens	Springdale	very high	high	very high	not	med	high	not	not	not	not	not	not	not
423	WA	Walla Walla	Burbank	low	not	not	not	not	not	low	not	not	not	very high	med	med
424	WA	Walla Walla	College Place	low	not	not	not	not	not	not	not	low	med	not	not	low
425	WA	Walla Walla	Prescott	low	med	not	low	not	not	high	not	not	not	not	not	med
426	WA	Walla Walla	Waitsburg	med	high	not	not	not	not	not	not	not	not	not	not	not
427	WA	Walla Walla	Walla Walla	not	not	not	not	low	not	not	not	low	low	low	low	not
456	WA	Whitman	Albion	very high	not	not	not	not	not	not	not	low	not	not	not	med
434	WA	Yakima	Grandview	med	not	not	not	not	not	low	not	not	not	not	not	low
435	WA	Yakima	Granger	low	low	not	not	not	low	not	not	low	not	low	low	low
436	WA	Yakima	Harrah	med	low	not	not	not	not	not	not	not	not	not	not	med
437	WA	Yakima	Mabton	low	not	not	not	not	not	not	not	not	not	not	not	high
438	WA	Yakima	Moxee	med	med	not	low	very high	low	not	not	not	not	low	not	not
439	WA	Yakima	Naches	not	med	not	not	very high	not	low	not	not	not	not	not	med
440	WA	Yakima	Selah	not	not	not	low	not	low	not	not	not	low	not	not	low
441	WA	Yakima	South Broadway	not	not	not	not	not	not	very high	not	not	not	not	not	not
442	WA	Yakima	Sunnyside	low	low	not	not	not	not	not	not	not	low	not	not	low
443	WA	Yakima	Terrace Heights	not	not	not	not	not	not	very high	not	not	not	not	not	not
444	WA	Yakima	Tieton	low	not	not	not	not	not	not	not	low	low	not	not	low
445	WA	Yakima	Toppenish	not	not	not	not	not	not	not	not	not	low	high	low	low
446	WA	Yakima	Union Gap	not	not	not	not	very high	not	low	low	not	not	not	not	not



**Table 6. Employment Specialization by Industry Category for 423 Communities in the Interior Columbia Basin.<sup>1</sup> (continued)**

Place No. <sup>2</sup>	State	County	Town	Agricult. <sup>3</sup>	Agricult. Services <sup>3</sup>	Mining <sup>3</sup>	Constr. <sup>3</sup>	Wood	Other <sup>3</sup> Mfg.	Transp. <sup>3</sup>	Trade <sup>3</sup>	Finance	Federal <sup>3</sup> Govt.	Local <sup>3</sup> Govt.
								Products <sup>3</sup> Mfg.				Insurance, R.Estate <sup>3</sup>		
447	WA	Yakima	Wapato	med	low	not	not	not	not	not	not	not	not	low
448	WA	Yakima	White Swan	med	low	not	not	very high	not	not	not	not	not	very high
449	WA	Yakima	Yakima	not	not	not	low	high	not	low	low	low	low	not
450	WA	Yakima	Zillah	med	not	high	not	high	high	not	not	not	not	not
454	WY	Teton	Jackson <sup>4</sup>	not	not	not	high	not	not	not	not	low	low	not

**Abbreviations used in this Table:**

Agricult. - Agriculture  
 Constr. - Construction  
 Govt. - Government  
 Mfg. - Manufacturing  
 R. Estate - Real Estate

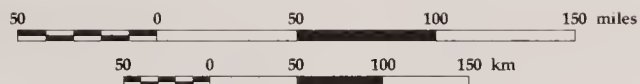
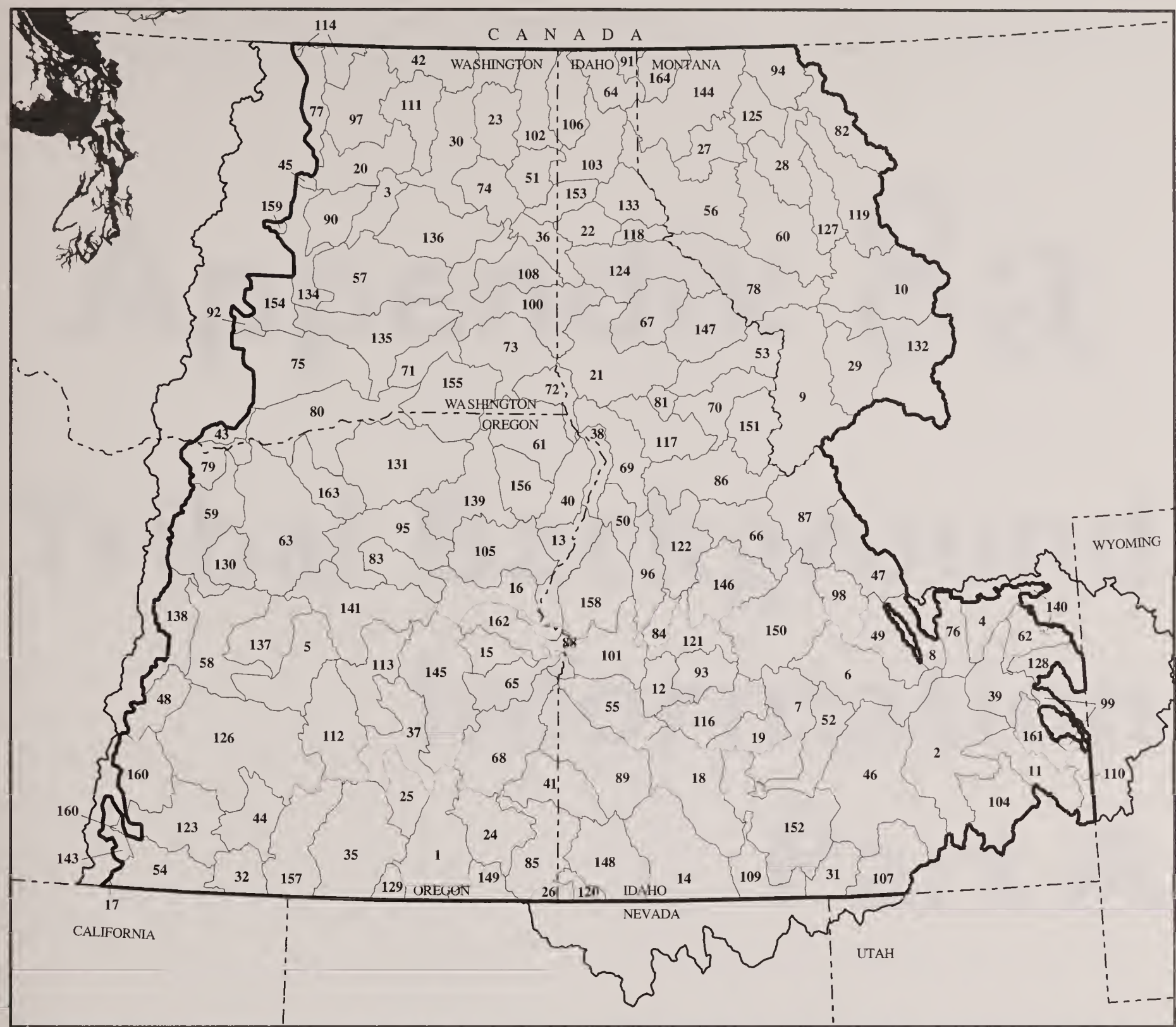
<sup>1</sup> The set of 423 communities does not include all communities in the interior Columbia Basin, but only those for which employment data were available. Therefore, some communities are not listed in the tables.

<sup>2</sup> Community Location Numbers used for identification/mapping purposes only.

<sup>3</sup> Employment Specialization rankings based on the Specialization Ratio for each of the 12 industries in each town: Ratios: Not (  $\leq 1$  ); Low (  $>1 <2$  ); Med (  $\geq 2 <3$  ); High (  $\geq 3 <5$  ); Very High (  $\geq 5$  ).

<sup>4</sup> This community was in the original Columbia River Basin Assessment area, and was included in the Reyna (1998) report, but is no longer within the Interior Columbia Basin Project area covered by this SDEIS.

Source: Reyna, Economic and Social Conditions of Communities, 1998.



Subbasins

- Subbasin Borders\*
- Supplemental Draft EIS Area Border

INTERIOR COLUMBIA  
BASIN ECOSYSTEM  
MANAGEMENT PROJECT

Supplemental Draft EIS Area  
2000

\*See Table 1 in this appendix (Appendix 7) for the subbasin names.





# Appendix 8a

## Tribal Background Information

### Part A

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# Introduction

Appendix 8 contains information about the American Indian tribes that have reservations, ceded lands, and areas of interest within or bordering the Interior Columbia Basin Ecosystem Management Project (ICBEMP) project area. Twenty-two federally recognized tribes have worked with the project staff, providing information about their respective tribe and concerns.

Appendix 8a is presented in three sections: Summary of General Information Sheets; Evaluating Habitat and Harvestability, and Addressing American Indian Rights and Interests; and Government-to-Government Consultation with American Indian tribes. Appendix 8b (available separately) provides further details on federal court cases with applications for multiple tribes, individual information sheets for each of the affected tribes in the project area, a chronology of the legal status of American Indian tribes, a list of Tribal Employment Rights Ordinance (TERO) contacts, and a discussion of ethno-habitats. The complete appendix (Parts A and B) gives an overall picture of the concerns of the American Indians and how the ICBEMP is striving to incorporate their concerns into ecosystem management of the project area.

## Summary of General Information Sheets for Affected Tribes in the ICBEMP Planning Area

The United States government has a unique relationship with federally recognized American Indian tribes. As federal agencies undertake activities that may affect tribes' rights, property interests or trust resources, care should be taken to implement agency policies, programs and projects in a knowledgeable, inclusive, and sensitive manner respectful of tribes' sovereignty and needs.

The general information sheets prepared for Appendix 8 briefly describe each of the 22 affected federally recognized tribes of the project area. Information is presented in the sheets that may be helpful to agency managers in developing an understanding of the federal trust responsibility and individual tribes and their organizational structures, which in turn should prove useful in maintaining agency-tribe relationships. This summary provides background information and an explanation for each subsection in the general information sheets. The individual information sheets are provided separately in Appendix 8b.

**NOTE:** Although both tribes and agency legal council were provided opportunities to review these EIS appendix materials, the information presented does not necessarily represent either tribal or federal government views, but rather the ICBEMP's best understanding of the affected tribes.

## Tribes and Bands

The names of tribes and bands in this section were taken from ratified treaties and signed executive order documents, which formed the basis for a tribe's formal federal recognition. In a few instances, additional names preferred by a tribe to identify a band or tribal subdivision are also noted. Many of the names in this section are anglicized versions of native terms, historical creations, or historical versions of another band's name for the group (usually a neighboring band/tribe). There are other native names and member bands which a tribe may recognize.

## Basis for Legal Status

The basis of a tribe's legal status rests within the context of U.S. constitutional provisions for the federal government's powers for treaty making with other sovereign nations, and with American Indian tribes' inherent sovereignty. The treaty-making period between the U. S. government and American Indian tribes ended in 1871. The federal government thereafter relied on agreements (signed by both houses of the Congress) to legally acquire Indian lands, to establish reservations, and to provide federal recognition of tribes and remove Indian peoples to reservations or rancherias.



A tribe's legal status is also derived through agreements with the U.S. government; congressional and executive branch recognition of the tribe; and federal court interpretations of Indian law and legal documents, such as treaties, executive orders, agreements, federal statutes, and other government-to-government agreements. Tribes also have constitutions and by-laws, which formalize their governmental organization and state their relationship with the U. S. government.

Additional sources of legal recognition may be found in federal statutes and congressional acts, which often do not distinguish between federally and non-federally recognized tribes and bands. Examples of the latter include American Indian Religious Freedom Act, Executive Order on Environmental Justice, Native American Graves Protection & Repatriation Act, National Environmental Policy Act (NEPA), National Historic Preservation Act, and Religious Freedom Restoration Act. Also, some states have special agreement documents and established government-to-government relations recognizing a tribe(s)/band, and their interests and needs.

## Basis for Off-Reservation Interests and Rights

All tribes have off-reservation interests in public lands and some retain pre-existing rights reserved through treaty or executive order language. Tribal interests in federal lands may be related to traditional and cultural uses; water-land well being, or the socio-economic needs of tribes. Tribal rights typically include treaty-reserved rights to fish, hunt, gather, trap, and graze livestock, and implied rights of water quality and quantity, access to resources, and an environmental right including available healthy and sustainable habitats. Other rights include protection of reservation property, trust resources, air quality, water quality and quantity and social well being.

The legal basis of these tribal interests and rights is founded in the inherent sovereignty of tribes; continuing aboriginal rights; pre-existing rights reserved in treaties and executive orders; agreements (passed by both houses of the federal government); and federal statutes. Some of these in turn have been interpreted through federal court decisions. Where appropriate, examples of a tribe's reserved rights are provided as stated in their treaty or executive order. Congressional direction for tribal socio-economic

self-sufficiency and social well-being on their reservations, along with the federal government's goal of tribal self-determination, provide further basis for tribal interests and rights outside Indian lands.

Additional sources of legal rights may be found in special agreements and recognition provided by states over their long history of relationships with tribes.

Examples of tribal rights and interests in federal agency lands includes: traditional cultural practices; ethno-habitats; various resources associated with tribal rights and interests; ecosystem health; communally valued sacred and legendary places; and socio-economic opportunities such as livestock grazing.

## Relevant Federal Court Decisions

Although numerous federal court decisions involve tribal interests and rights, only those federal court cases where a tribe was a named part to the case are listed in this section. Many other cases which may have direct or indirect bearing on a given tribe are not listed because they are too numerous. However, an example set of federal court cases that have regional importance is included in Appendix 8b, available separately.

State court cases have been noted where they have not been taken to a federal court to address a like off-reservation tribal interest or right.

Federal agencies have trust obligations to address effects on tribal interest, rights, and property on reservations, and they are required to disclose known effects through the NEPA process. Some standard federal court cases are cited that discuss federal agency trust responsibilities and obligations to tribes concerning water quality and quantity, air quality, or property of Indian reservations as well as social, economic, and cultural interests and rights.

## Land Base

Pre-treaty land base figures are based on acreage of the homelands of tribes and/or lands ceded by tribes to the U.S. government as provided by either tribes or available literature. Reservations have invariably



experienced changes in their size since they were first established, so the original reservation acreage, a sketch of some causes of size changes, and the current reservation acreage are provided.

*Trust land* refers to tribal land held in trust for the tribe by the federal government, usually through the Department of the Interior's Bureau of Indian Affairs (BIA). *Fee or fee simple land* refers to land within reservation boundaries not federally owned, but owned by the tribe or individuals (tribal or non-tribal members). *Allotted land*, allotted to tribal members through the 1897 Indian Allotment Act until the Indian 1934 Reorganization Act, may be individually owned or land held in trust located either within or outside a reservation. The ownership status of Indian allotments and fee lands are usually not affected when reservations have been abolished by the U.S. government. *Indian country* refers to all land within an Indian reservation except for non-Indian communities. Trust lands, restricted Indian allotments, and federally tribal-dependent Indian communities outside a reservation are also considered Indian country.

## **Tribal Headquarters**

Tribal headquarters are typically both the seat of tribal governments and the location of tribal administration. Bureau of Indian Affairs field offices have often been located in or nearby tribal headquarters. Most tribal government offices are located in more than one building, some in building complexes, and for large tribal organizations they may be spread across reservations and/or in more than one community. However, most federal agency contacts will be directed to a tribe's primary government office - tribal headquarters. Although tribal offices are typically open weekdays, it is generally easiest to contact tribal staff Monday through Thursday. Tribes designate their respective administrative leave days which may or may not coincide with federal holiday and leave days. Many tribes will also close offices when a tribal leader passes on or during their tribal celebrations.

## **Tribal Population**

Estimates of tribal populations from the mid 1800s are typically imprecise owing to the nature of how population numbers were compiled for peoples that actively travelled, and to census takers' imperfect

understanding of band organizations. More recent population figures are based on tribal enrollment numbers that include both reservation and off-reservation residents; however, concern persists in Indian country over underrepresentation, and a campaign has been instituted to get a more accurate census count in the year 2000.

## **Cultural Affiliation**

Each federally recognized tribe has member bands that anthropologists have assigned to one of several Cultural Areas encompassed by the ICBEMP project area. These Culture Areas include the Californian, northern Great Basin, and Plateau. The Blackfoot Tribe is culturally affiliated with the Plains Culture Area. The persistence of fundamental aspects of tribal cultures are typically strongly influenced by both the culture history of a tribe(s) and the broad cultural patterns of these Culture Areas.

## **Religions**

Most tribes continue to practice their communally shared traditional religious and spiritual belief systems, religions that are a blend of traditional and Christian religious systems, and Christianity. Native religious systems and spiritual and healing practices originating from areas outside the ICBEMP project area are also present and respected by tribes.

## **Languages**

All affected tribes speak English as their primary language. However, native languages and dialects are still spoken and many tribes have or are currently developing native language programs to ensure native language survival and use. Some tribes continue to use interpreters to facilitate communications in tribal business meetings.

## **Governance**

This section identifies what sort of tribal organization exists for a tribe and the legal basis for its legal structure. For example, whether a tribe opted for the provisions of the Indian Reorganization Act following its passage is noted, along with whether a tribe



has chosen a self-governance form of organization, or varying forms of self-determination. The latter typically implies one of three trends: (1) integration of BIA staff, (2) decreased reliance on BIA support, or (3) continuance of an existing BIA role in tribal governance. A brief description of tribal government structure is identified including their kind of governing body. The tribe's constitution and by-laws, tribal ordinances and codes, and tribal plans are referenced as appropriate. Operative tribal ordinances and resolutions historically have been subject to Secretary of the Interior review and approval.

## Pre-Treaty Economy

Historically, area tribes and bands were economically interdependent and were sustained by subsistence economies that have often been described in legal documents in terms of primary activities, such as fishing, gathering, hunting, trapping, and animal husbandry. Early historical Indian economies were interrelated with the social, political, and religious components of their cultures. These economies were also influenced by non-traditional material goods, (such as guns, kitchen ware, and the like), and economic practices (such as agriculture, the fur trading industry, and others).

## Tribal Enterprises

Tribal owned and/or operated enterprises provide socio-economic benefits to tribal membership and tribal interests, and they often provide support to tribal government infrastructure. These enterprises are varied and often reflect tribal values and interests. Many tribal businesses depend on the opportunities of their locations, resources, and interrelationships with states, non-tribal communities, and tourism.

Most are not directly dependent on traditional non-Indian uses of federal lands such as timber harvest, recreation, and livestock grazing. However, some tribes such as the Northern Paiute tribes are increasingly looking toward livestock grazing of federal lands as a means to support tribal socio-economic well-being and economic diversification. Indirect effects of federal land management on tribal enterprises may involve tribal commercial fishing, fisheries, reservation timber industries, mining, oil and gas development, and tourism.

## Tribal Private Sector

Tribal member-owned enterprises often range in their variety and are typically less dependent on federal land activities than tribal enterprises. Exceptions are in the areas of commercial and subsistence fishing, gathering, hunting, and grazing.

## Education Institutions

Many tribes have or are developing tribal educational systems ranging from preschools to colleges, and work with neighboring non-Indian educational institutions and more distant universities where Indian youth attend. In addition to standard forms of education, some tribes have native language, cultural, and art institutions or programs. Many tribes have educational materials describing their cultural, history, tribal rights/interests, and/or current activities, which may be made available to federal managers and the public.

## Museums

Tribal museums, cultural institutes and centers, and cultural interpretative facilities are increasingly being established on or near tribal lands. These are Native American cultural facilities and centers, which provide tribal cultural perspectives and educational opportunities for both tribal members and the public. Some tribes such as the Yakama Indian Nation have sophisticated archival facilities.

## Tribal Newspaper

Of the 22 affected ICBEMP tribes, 15 tribes carry a regularly distributed tribal newspaper or newsletter available to all interested subscribers. A few papers are produced at no cost to subscribers. These papers are an invaluable source of information and provide tribal news, media access, local and regional current affairs and events, Indian country issues, and special interest items. Information on federal and state agencies' actions, activities, and meetings are often reported.



## Tribal Departments and Programs

Tribal programs with off-reservation involvement are listed to help identify the range of tribal interests in resources and land as well as tribal program activities and capabilities. All but the smallest tribal organizations have tribal departments and programs, which are staffed with technical expertise from a wide range of health, social, natural resource, and administrative disciplines. These may or may not work closely with counterpart Bureau of Indian Affairs office staff depending on tribal government organizational decisions. Those tribes that have chosen a form of self-governance have taken over most past BIA field office departments and roles. Tribes such as the Colville have chosen to cooperatively mix responsibilities between BIA and tribal staff. Still other tribes are currently reviewing how they would prefer to work with local BIA offices.

## Tribal Fisheries (Ethno-habitats)

Most affected tribes place an importance on protection and restoration of their socially and traditionally significant habitat places. Primary aquatic habitats for tribal fishing are best known and reported here for each tribe. All culturally significant fish-bearing-capable streams, rivers, and lakes found within a tribe's area of interest (aboriginal homelands and ceded lands included) should be considered probable locations of a tribe's fisheries and/or fishery interests. This includes legally recognized tribal usual and accustomed fishing grounds and stations on and off reservations for those tribes with Stevens Treaties.

This section emphasizes tribal fisheries with continuing social, economic, and/or cultural significance to tribes. However, tribal hunting and gathering areas (ethno-habitats), though less well known, are mentioned for some tribes where well-recognized examples exist.

Subsistence in subsistence areas and ranges refer not only to foods for physical nutrition, but also to lands and resources important for socio-cultural sustenance and maintenance of tribal community well-being.

## Tribal Contact

The ICBEMP's primary tribal contact(s), usually an appointed federal agency liaison, or available leadership from smaller tribal organizations, are listed along with their phone and fax numbers. Though agency-tribal relations may lean on such liaison contacts, they should not be considered the sole source for technical or policy information and cannot be used for purposes of project consultation unless the tribal government clearly designates them as such.

## Agency Contact

The ICBEMP Bureau of Indian Affairs contact, usually the local BIA office superintendent, and his or her address, phone number, and fax number is provided.

## Significant Events and Dates

*Socio-cultural:* Each tribe and associated communities have social and cultural activities held annually as well as community and extended family events. The latter, such as weddings, funerals, namings, and giveaways, may occur at any time of the year. Taken together these activities help provide an understanding of tribal social life and values. Both types of tribal activities could affect meeting schedules in addition to tribal business schedules depending on employee roles in organizing or participation.

*Government:* Each tribe has its own electoral system or variation of a type found among other tribes. The times of tribal government elections for tribal and general council positions and how they are performed differ by tribe, owing to differences between tribal constitutions and/or traditional laws. For example, some tribes elect their "council" as a whole, while others elect a council in parts over a period of years. Tribal elections may occur annually or periodically. Elections may be by ballot or through a traditional open voting method. Tribal council meetings may be open to tribal membership on a selective basis or frequent basis. How often a tribal or general council meets to conduct business also varies by tribe. Under-



standing how a tribe generally schedules its time for tribal business may help provide a logistical understanding to facilitate agency-tribal consultation, identify when changes might occur in tribal governing structures, and develop a fuller understanding of a tribal government.

## Tribal Governing Bodies

The governing body of a tribe may have one of the following titles: Tribal Council, Business Council, Executive Committee, or Board of Trustees. A tribe's governing body (Council) is typically elected from the general council membership, which consists of enrolled tribal members 18 years of age or older. These councils may be elected by reservation districts, or in other tribes by members at large. A typical tribal governing body will have selected officials (sometimes elected by Council vote) that function as a chair, vice-chair, secretary, treasurer, and in some cases as an assistant secretary and sergeant-at-arms. A chairman or these selected officials sometimes serve to handle specific council decisions, although their roles are often specific to collective Council functions.

Each tribe has a somewhat different tribal government structure depending on its legal and organization history. The terms and available positions elected officials hold vary by tribe in both their tribal council and general council seats and committees membership. All tribes have the first two categories of governmental groups; however, not all function with committees. How tribal governments are organized are usually described in their constitution and by-law documents. The Yakama Nation is an exception in that it never adopted a constitutional form of government, preferring to operate under traditional laws and through ordinances, and general or tribal council resolutions.

Most tribal governments affected by the ICBEMP operate with either a Tribal Council (12 tribes), or a Business Council (7 tribes). However, the Confederated Tribes of the Umatilla Reservation has a Board of Trustees, and the Klamath Tribes and Nez Perce Nation have Executive Committees.

## General Council

Most tribes have a General Council, which comprises all enrolled members. Typically, only members 18 years of age or older are entitled to voting rights and certain other privileges of tribal citizenship. General Councils typically have elected officials to address tribal business concerns including a chair, vice-chair, and secretary; some tribes also have one or more interpreters. These positions may be filled by the same officials as on the Tribal Council in some tribes. The relationship between the General Councils and Tribal/Business type Councils is variable, although in most tribes the General Council retains authority to restrict or amend Tribal Council actions and decisions. Certain tribal business issues may be required to be brought before the General Council for review and direction prior to a tribal government decision. General Council meetings may be held through the year to address tribal business at regularly scheduled times or through special meetings. General Councils having the authority to elect tribal council members may also choose to express direction to a Council through an electoral avenue either at regular or early elections.

For those tribes that do not have a General Council, tribal membership participate as a rule in the regular Tribal/Business Council meetings. Examples of tribes in this category include the following: Coeur d'Alene Tribe, Salish and Kootenai Tribes of the Flathead Reservation, Shoshone-Paiute Tribes of the Duck Valley Reservation, Pit River Tribe, and the Quartz Valley Indian Community of the Quartz Valley Reservation.

## Committees, Commissions, and Boards

Tribes typically develop and implement policies through the use of a variety of committees, commissions, boards and/or task forces. Those listed in this section of the general information sheet provide both an indication of the breadth of issues tribes routinely address, and the groups with whom federal land



managing agencies may necessarily work directly. Each tribe may use these organizational groups in different ways and empower them with different kinds of responsibilities and degrees of authority.

Agencies need to become aware to what degree these groups can speak for tribal rights and interests and what their relationship is with both Tribal Councils and departments/programs. Relationships with these tribal groups could become an integral way an agency unit and a tribe decides to conduct informal dialogue, but it cannot be mistaken as consultation between an agency and tribe unless the tribal government designates it as such.

## Tribal Area of Interest Maps

For those tribes whose tribal headquarters are within the project area, a map showing its aboriginal area of interest is shown in context with ICBEMP and state boundaries. These interest areas indicate the fundamental geographic range of interest for any particular group (that is, the approximate sum of such interest areas a tribal government represents for its member bands and people).

Individual tribal governments express their interest and concerns for tribal traditional uses, landscapes and resources, and needs of its communities within in the context of their own area of interest. A tribe's homeland is typically located near the center of its interest area and is where primary tribal use of resources and land occurs. Shared resource use areas (cross-utilization areas) are usually near interest areas' peripheries and contribute to reasons why tribal interest areas often overlap one another.

The boundaries of interest areas are necessarily vague and can only be approximated to encompass expansive areas of tribal interests and influences. They should serve as an aide to opening dialogue with individual tribes. **Tribal interest areas are not expressly or legal defined, but are open to ongoing interpretation and discussion on a project-by-project basis. They should not be interpreted to expand or limit tribal rights and interests nor agency responsibilities.** Those maps displayed in Appendix 8b represent areas used in the ICBEMP *Scientific Assessment* and do not reflect corrections provided by either the Coeur d'Alene or Kootenai of Idaho tribes.

Interest areas have sometimes been called a tribe's aboriginal territory, subsistence range, traditional use area, or zone of influence. The term 'usual and

accustomed area' by contrast, refers to Stevens Treaty language rights and interests, which are themselves smaller in area than Interest Areas, but may help define the spatial extent of a tribe's interest area.

## Tribal Ceded Lands, Aboriginal Lands, or Court of Claims Maps

For those tribes with treaties, either those aboriginal territories ceded to the U.S. government or the aboriginal territories themselves are shown on maps in Appendix 8b based upon the legal descriptions provided in treaty language (Portland Area Jurisdiction, Department of the Interior, Bureau of Indian Affairs, Indian Treaty Boundaries Map, 1986). Only ceded and aboriginal lands located within the boundaries of the project area are shown on the General Information Sheet maps. The Shoshone tribe as found on the Fort Hall, Northwest band Shoshone and Wind River reservations has aboriginal territory, which extends outside the project's boundary given the Treaty with the Eastern Band Shoshoni and Bannock, 1868.

Ceded boundaries and reservation boundaries are precisely defined in United States legal documents. Two types of negotiated land areas are recognized: (1) ceded land area, which pertain only to those tribes that ceded lands to the U.S. government by treaty or agreement; and (2) exclusive use land areas, whose boundaries were established through a modern land claims process. Ceded territory boundaries were typically established by U.S. treaty negotiators, often prior to the actual treaty council meetings. Exclusive use area boundaries are based on arguments provided to the Federal Claims Commission, which tended to focus on "exclusive use" core areas and to exclude the full area of a tribe's subsistence range.

These two types of areas are normally geographically large, but usually much smaller than interest areas. Both are constructs developed as a result of U. S. Indian policy (treaties and the Indian Claims Commission Act) and are legally meaningful largely to address tribes' right and title to land. Ceded land may have importance where legal questions pertain, but as a spatial unit may lack traditional significance to Indian peoples. For example, as Indian case law has shown, usual and accustomed fishing sites and other traditional use locations are defined within interest areas, not within ceded territories or land claims boundaries.



Ceded boundaries, where they exist, tend to establish a modern-day version of exclusive use areas, serving to identify supremacy of a tribe's interests over other tribes in certain areas. They also form convenient administrative boundaries for tribal land use planning efforts and, in some cases, are viewed by tribal staff as defining the tribe's interest area.

Ceded lands, Court of Claims, and treaty aboriginal lands maps have not changed since the Draft EISs were published and therefore they were not reprinted in this appendix. These maps can be found in Appendix 1-2 in the Eastside Draft EIS and Appendix C in the UCRB Draft EIS. Area of Interest maps are included in this appendix, because they have been slightly modified from the Draft EISs to clarify their intent.

# Evaluating Habitat and Harvestability, and Addressing American Indian Tribal Rights and Interests

## Introduction

A primary concern of the Indian tribes in the Interior Columbia Basin Ecosystem Management Project area is the availability of the resources to which they have an interest. At issue is the availability of resources in sufficient quantities to allow harvest. A harvestable level would be one which would allow harvest or use of resources in sufficient quantities to satisfy the ceremonial, subsistence, and commercial needs of tribes at sufficient levels, while still providing for the conservation needs of the species. As noted in Chapter 2, it is recognized that differences exist in the meaning of harvestability with regard to U. S. case law and tribal desires for future socio-cultural conditions.

It is a legal responsibility of the federal agencies to consult with the tribes and to take into account their needs in analysis and decision-making processes. This section describes the method used to classify habitat rankings or outcomes to indicate trends and to indicate the habitat's ability to support harvestable resources.

## How Trends Toward Harvestability Were Evaluated

The ICBEMP used trends in habitat status or outcomes to measure the habitat's capability to sustain populations. Using these concepts, trends in habitat conditions can be predicted for sustaining resources of interest to the tribes at harvestable levels.

The Aquatic section of Chapter 4 used changes in aquatic habitat capacity and population status to indicate trends. Habitat capacity and population status estimates for six key salmonid species at the 6th-field Hydrologic Unit Code (HUC) (subwatershed) were categorized as follows:

### Population Status:

**Strong** - All major life history types that historically occurred are still present; numbers are stable or increasing; the population is likely to be at half or more of mean historical size or density; or the population or metapopulation within the subwatershed (or within a larger region of which the subwatershed is a part) probably contains at least 5,000 individuals or 500 adults.

**Present** - Spawning and rearing life stages occur in the subwatershed; populations may be strong or depressed. The probability of present is the sum of strong and depressed population status probabilities.

### Habitat Capacity:

**High** - Sediment input and riparian conditions that influence the creation and maintenance of suitable habitat for salmonids have not been substantially altered or constrained by human



influences. The frequency of channel reorganizing events due to upslope activity also has not been changed. At the time of evaluation, the subwatershed supports approximately 75 to 100 percent of the potential habitat capacity.

**Moderate** - Sediment input, riparian conditions, and/or the frequency of channel reorganizing events have been altered by human activities such that, at the time of evaluation, a subwatershed supports 50 to 75 percent of the potential habitat capacity.

**Low** - Sediment input, riparian conditions, and/or the frequency of channel reorganizing events have been altered such that, at the time of evaluation, a subwatershed supports less than 50 percent of potential habitat capacity.

Changes in present-strong and high aquatic habitat capacity for the key species are estimated for each subwatershed that supports spawning and rearing habitat. Results are summarized for federal lands over the long term in Chapter 4. (See chapter 4 for further information on methodologies.) Changes in counts and probabilities provide an indication of trends in conditions towards "harvestable" populations. These changes can then be tracked through the modeling of scenarios by alternative to determine what factors reduce, improve, or maintain conditions affected by land management through time, thereby assessing likely broad-scale trends toward "harvestability."

Trends in aquatic habitat and status were predicted on a broad scale based on the land management effects of the alternatives. By assessing the effects of the alternatives, judgements can be made on whether aquatic habitat capability or status will change, reflecting the likely trend of habitat and population conditions supporting harvestability. If habitat capacity and species status is projected to improve, then it is likely trends in condition that support harvestability will improve. The expected rate of improvement is reflected by the magnitude of change compared to current conditions and relative to other alternatives.

The effects of alternatives on terrestrial species, particularly the degree to which habitat conditions contribute to the long-term maintenance of plants and animals is presented in the Terrestrial and Social-Economic sections in Chapter 4. The evaluations provided a reasoned series of judgements about projected amounts and distributions of habitat and

the likelihood that such habitats would allow populations to persist over 100 years.

These data can then be used to determine if a habitat capacity will be maintained through time and how that may affect "harvestable populations." By assessing the effects of the proposed action we can estimate trend in harvestable levels.

Habitat on federally managed lands continues to be an important factor contributing to the availability and harvestability of plant, fish, and animal species critical to the rights and interests of American Indian tribes. These approaches reflect how habitat trends toward harvestability were assessed by the ICBEMP. This should be used only as a starting point for continued consultation between field units and individual tribes in further defining means to identify and evaluate how federal habitat is faring and the implications of the results to species and harvestability.

## Consideration of Habitat, Tribal Rights and Interests, and Harvestability in Implementation

Direction to address the rights and interests of tribes is provided throughout the EIS and specifically for harvestability in the Terrestrial and Aquatic Species sections. Each of the affected tribes has unique rights, interests, and opportunities which can best be discussed at finer scales between tribal representatives and land managers, rather than possibly being inaccurately predicted at the broad scale. Therefore, management direction tends to be process oriented, focusing on the expected outcome of implementation and relying on consultation with individual tribes at finer scales to bring more specificity to the analysis and/or decision making processes.

Additionally, while scale presents problems in terms of evaluating effects on specific species or resources critical to the rights and interests of tribes, scale is not the only factor which makes an assessment difficult at the broad scale. The primary factor is the individuality of each American Indian tribe within the basin. Individual tribes and tribal governments are unique, as are their rights and/or interests. For this reason, issues common to the rights and interests of the 22 involved tribes was the focus of the broad-



scale assessment and EIS. At finer scales, through consultation with individual tribal governments, agencies can begin to understand the unique rights and interests of a particular tribe and in so doing, be responsive to the issues and opportunities presented by that tribe.

Step-down processes should be conducted as typified by the management direction on this subject. A standard requires that "During EAWS or Subbasin Review, or prior to project implementation, federally recognized tribes shall be consulted to: (1) invite participation, (2) solicit data and information useful in the analysis/review, (3) identify if resources or species of significance to the tribe(s) are present, (4) characterize these resources or species using available information, (5) solicit tribally identified priorities and possible management and monitoring opportunities or indicators, and (6) use this information to provide context for finer scale analysis as well as to inform planning and decision-making processes."

An important consideration in the characterization and analysis of these resources is the historical presence and/or occurrence of tribally significant species and resources. (A restoration guideline speaks specifically to consideration of historically occupied habitats.) A number of the tribes were concerned about land managers considering only those areas presently occupied by a species or resource, when the tribe traditionally used many areas where a species or resource critical to their rights and interests may not currently exist. "Available information" is meant to include information from all available sources including that information provided by tribal sources. In order to provide habitat capable of supporting harvestable resources or species, the agencies must understand what and where these resources are and how they relate and contribute to the ecosystem/landscape. As managers of their own land and natural resources, American Indian tribes may have data, information, or expertise that could be useful in informing agency planning and decision-making processes.

An additional consideration under the availability of sufficient habitat for harvestable resources is competition. The availability of any particular resource is influenced by competition for that resource. While some of the tribes in the basin have reserved rights associated with lands and resources, these off-reservation rights do not provide for exclusive use. There is increasing competition for many of the resources and lands used by the tribes. For example, it is becoming more and more common for the tribes to find themselves being outcompeted by commercial or recreation-related interests for resources that are an integral part of their culture and/or associated with reserved rights; the commercial harvest of huckleberries, mushrooms, and sweetgrass are prime examples. The same correlation exists for commercial or recreational use of fish and wildlife species, firewood, and some plants.

Consideration of tribal rights and interests, including harvestability, must be a part of agency decision-making processes. Information gained from these step-down processes should feed into subsequent decisions. Just as the agencies have typically examined and considered the impacts of land management actions on recreational and/or commercial uses, so shall we consider treaty and traditional uses where they exist. The consideration of harvestability is typified by management direction on this subject. For example, a standard states, "As part of site-specific NEPA analysis, affected federally recognized tribes shall be consulted to: (1) identify resources or species important to tribal rights and/or interests, (2) assess effects of the proposed action(s) on these resources and/or species, and (3) if it is determined that the project may negatively affect the continued harvestability of these resources or species of significance to tribes, then mitigate accordingly."

**Available resources:** See the list of culturally significant plant species in Table 1, as a starting point for tribal consultation. Additional information can also be gleaned from the myriad of science reports involving those resources, areas, and species denoted by a respective tribe as important to their particular rights and interests.



Table 1. Starter List of Some Culturally Significant Plant Species.<sup>1</sup>

Common Name	Scientific Name	Current Scientific Name
taper-tip onion	<i>Allium acuminatum</i>	
wild onion	<i>Allium spp.</i>	
alder	<i>Alnus incana</i>	
serviceberry	<i>Amelanchier alnifolia</i>	
hemp	<i>Apocynum cannabinum</i>	
pinemat manzanita	<i>Arctostaphylos nevadensis</i>	
bearberry	<i>Arctostaphylos uva-ursi</i>	
sagebrush	<i>Artemisia tridentata</i>	
saltbrush	<i>Atriplex confertifolia</i>	
balsamroot	<i>Balsamorhiza hookeri</i>	
balsamroot	<i>Balsamorhiza sagittata</i>	
Oregon grape	<i>Berberis nervosa</i>	
brodiaea	<i>Brodiaea grandiflora</i>	<i>Triteleia grandiflora</i>
buttons	<i>Brodiaea hyacinthina</i>	<i>Triteleia hyacinthina</i>
black moss	<i>Bryoria fremontii</i>	
mariposa lily	<i>Calochortus macrocarpus</i>	
sego lily	<i>Calochortus nutalli</i>	
camas	<i>Camassia leichtlinii</i>	
camas	<i>Camassia quamash</i>	
Indian potato	<i>Claytonia lanceolata</i>	
red willow	<i>Cornus stolonifera</i>	
hazelnut	<i>Corylus cornuta</i>	
hawthorn	<i>Crataegus columbiana</i>	
hawthorn	<i>Crataegus douglasii</i>	
giant wildrye	<i>Elymus cinereus</i>	
wild strawberry	<i>Fragaria vesca</i>	
wild strawberry	<i>Fragaria virginiana</i>	
yellow bells	<i>Fritillaria pudica</i>	
sunflower	<i>Helianthus annuus</i>	
cow-parsnip	<i>Heracleum lanatum</i>	
juniper	<i>Juniperus occidentalis</i>	
bitterroot	<i>Lewisia rediviva</i>	
Canby's licorice-root	<i>Ligusticum canbyi</i>	
Gray's licorice-root	<i>Ligusticum grayi</i>	
Canby's biscuit-root	<i>Lomatium canbyi</i>	
cous	<i>Lomatium cous</i>	
fern-leaf lomatium	<i>Lomatium dissectum</i>	
Gorman's biscuit-root	<i>Lomatium gormanii</i>	
early celery	<i>Lomatium grayi</i>	
Henderson's biscuit-root	<i>Lomatium hendersonii</i>	
big-seed lomatium	<i>Lomatium macrocarpum</i>	
purple lomatium	<i>Lomatium minus</i>	
celery	<i>Lomatium nudicaule</i>	
Piper's biscuit-root	<i>Lomatium piperi</i>	
early celery	<i>Lomatium suksdorfii</i>	
wild mint	<i>Mentha arvensis</i>	
mentzelia	<i>Mentzelia albicaulis</i>	
blazing-star	<i>Mentzelia laevicaulis</i>	
Indian tobacco	<i>Nicotiana attenuata</i>	
wocas	<i>Nuphar polysepalum</i>	<i>Nuphar lutea ssp. polysepala</i>
Indian rice-grass	<i>Oryzopsis hymenoides</i>	
Bolander's yampah	<i>Perideridia bolanderi</i>	

**Table 1. Starter List of Some Culturally Significant Plant Species.<sup>1</sup>**

Common Name	Scientific Name	Current Scientific Name
red-root yampah	<i>Perideridia erythrorhiza</i>	
yampah	<i>Perideridia gairdneri</i>	
apos	<i>Perideridia oregana</i>	
reedgrass	<i>Phragmites communis</i>	<i>Phragmites australis</i>
whitebark pine	<i>Pinus albicaulis</i>	
pinon pine	<i>Pinus monophylla</i>	
ponderosa pine	<i>Pinus ponderosa</i>	
Indian plum	<i>Prunus subcordata</i>	
chokecherry	<i>Prunus virginiana</i>	
Indian bread-root	<i>Psoralea esculenta</i>	<i>Pedimelum esculentum</i>
oak	<i>Quercus garryana</i>	
spring parsley	<i>Rhizopterus plurijugas</i>	<i>Cymopterus corrugatus</i>
wild currant	<i>Ribes aureum</i>	
rose	<i>Rosa nutkana</i>	
rose	<i>Rosa spp.</i>	
blackberry	<i>Rubus spp.</i>	
wapato	<i>Sagittaria cuneata</i>	
wapato	<i>Sagittaria latifolia</i>	
willow	<i>Salix spp.</i>	
elderberry	<i>Sambucus cerulea</i>	
tule	<i>Scirpus acutus</i>	
tule	<i>Scirpus validus</i>	
buffalo berry	<i>Shepherdia argentea</i>	
wada	<i>Suaeda depressa</i>	<i>Suaeda calceoliformis</i>
tauschia	<i>Tauschia hooveri</i>	
cattail	<i>Typha latifolia</i>	
low huckleberry	<i>Vaccinium caespitosum</i>	
delicious huckleberry	<i>Vaccinium deliciosum</i>	
huckleberry	<i>Vaccinium globulare</i>	
huckleberry	<i>Vaccinium membranaceum</i>	
oval-leaf huckleberry	<i>Vaccinium ovalifolium</i>	
cranberry	<i>Vaccinium oxycoccus</i>	
tobacco-root	<i>Valeriana edulis</i>	

<sup>1</sup> May be used as a beginning point for consultation with affected federally-recognized American Indian tribes.

Source: Croft et al. 1997.



# Government-to-Government Consultation with American Indian Tribes

## What is government-to-government consultation?

### *Government-to-government Terminology*

The U.S. government has a trust responsibility to federally recognized tribes. Additionally, all tribes have off-reservation interests within the Columbia Basin, and some have off-reservation rights reserved through treaty or executive order language.

Agencies are required to manage the lands under their stewardship with full consideration of the federal trust responsibility and these tribal rights and interests, particularly reserved rights where they exist.

The term 'government-to-government' recognizes the sovereign status of tribal governments, their unique relationship with the federal government, and the federal trust relationship between the federal government and federally recognized tribes.

From a federal perspective, government-to-government consultation is an ongoing process culminating in a negotiated understanding or agreement between governmental entities (federal and tribal). Because consultation is an ongoing process, there will be lesser or greater involvement of tribal governmental officials and agency policy makers depending on the goal of consultation and the particular point in the process where consultation is occurring. For example, in the earliest phases of consultation on a proposed action, the goal of consultation may be information sharing rather than consensus. In this case, the role of federal line officers and tribal government officials may be to listen and learn so they have a solid foundation on which to build future agreements and shared understanding. In another

phase, tribal and federal staff specialists may be more heavily involved than either federal or tribal policy makers. For example, one phase in the process may include data collection, information gathering, effects analysis or monitoring.

The goal of consultation may be for specialists to work jointly to address concerns or opportunities previously identified by federal/tribal decision makers. Toward the end of the consultation process, the primary participants may again be federal and tribal decision makers, and the goal of consultation would become negotiations toward a mutually agreed-upon solution. As in intergovernmental consultation, consensus is desired and shared understanding of and commitment to implementation of management direction are the goals of government-to-government consultation. However, when consensus cannot be attained, federal land managers retain authority and decision-making responsibility and accountability for lands under their jurisdiction. In this instance, the federal decision maker(s) will document how issues were addressed or mitigated, or they will explain why mitigation is not possible in their decision.

### *Tribally-defined Consultation*

As described in the example above, some tribal governments would only consider the culmination of the consultation process to be government-to-government consultation, not the dialogue leading up to the negotiated discussions. For these tribal governments, only when both "negotiated agreements" and "federal and tribal decisionmakers" are involved is there government-to-government consultation. Other tribes may think of the entire consultation process, including specialist discussions, as government-to-government consultation. Still others may not consider the process complete until the negotiated agreements have been formally documented and signed by both federal and tribal representatives, while another may prefer an oral understanding where no written agreement is made.

Tribes are cognizant of what level of the federal organization is represented in government-to-government consultation. Heads of their respective tribal governments expect that in negotiations with the state, the governor would be present or represented; negotiations with the federal government would be expected to be held with the president of the United States. On Forest Service and BLM projects, most tribes recognize the BLM district or area manager, forest supervisor, or district ranger as



the federal representative with delegated authority from the president of the United States. Therefore, the federal official with delegated authority for the involved decision is typically the appropriate federal official for government-to-government discussions with a given Tribal Council. Sometimes, however, tribal officials may want to discuss the decision at the next highest level to ensure that an agreement negotiated at this level will hold and not be overturned by a higher level decision maker.

It is critical that agency line officers gain an understanding of how respective tribes define government-to-government consultation so that they approach the relationship in a manner (a) that will accommodate consultation to the greatest degree practicable and (b) that ensures appropriate federal representatives are involved at the appropriate time in discussions with the tribe.

## Key Ingredients to Federal–Tribal Relations

Managers must recognize that while building and maintaining a relationship takes time, energy, and resources, there is great value in doing so. American Indian tribes not only have expertise and information which can inform federal decisions, but they also have a deep and abiding connection to these lands. The opportunity exists for federal land management to be enhanced by nurturing an effective working relationship with affected tribes. Some key components enable a successful relationship: commitment, mutuality, interdependence, respect, and an emphasis on the long term.

### Commitment

Probably the greatest asset an individual can bring to any relationship is commitment – the notion that they are willing to put forth the effort to make a relationship work.

### Mutuality

American Indian tribes have rights and/or interests in the federal lands administered by the Forest Service and the BLM. There is, therefore, mutual benefit in working collaboratively for the health and productivity of these lands. Often, however, land

managers focus only on what the federal benefits are. Federal managers need to work with respective tribes to ascertain and emphasize tribal as well as federal government benefits. The relationship should not be about others helping to do one partner's work, but rather the mutual benefit gained from accomplishing or working toward a common goal.

### Interdependency

The term “interdependency” describes a relationship where independent decisions are made, within respective authorities, but in support of a shared or common vision. In government-to-government consultation, the Tribe and the agency each bring their own span of authority and responsibility to the relationship. While consensus agreement is the goal of consultation, and while both tribe and agency strive to define or arrive at a common vision or objective, when this is not possible then the federal manager makes the decision and accounts for the consideration and accommodation of the tribe's rights and interests. Similarly, this is how intergovernmental collaboration with governmental partners (other federal agencies, states, tribes, counties) is defined.

### Respect

Federal land managers must understand and recognize the sovereign status of tribal governments and treat tribal officials with the respect accorded representatives of governments. Managers should also actively learn about the tribe (culture, government, protocols) so that cross-cultural communications have a greater opportunity to be successful. Also, representatives of American Indian tribes have knowledge, expertise, history, and experiences which should be solicited and used by the agency. While federal timelines are important, accommodating involvement and respecting the commitments of tribal partners is also important. Finally, managers should, as a matter of course, be able to demonstrate how tribal involvement contributed to agency decisions and actions.

### Trust

Trust is built over time. However, in large part, the ability for a federal manager to ensure some measure of confidentiality to a tribe or tribes is critical. While federal managers cannot protect and/or restore what they don't know about, neither can the tribe be



expected to provide specific information to the agencies without some assurance of its being kept confidential, much like the treatment of proprietary information in the business arena. Managers and employees should accommodate tribes on this issue and work together to build a mutually agreeable approach.

### ***Long-term Relationship***

Federal managers must emphasize the long-term nature of the federal-tribal relationship. It is common to approach a relationship differently if we recognize it will be for the long term. The history of the federal-tribal relationship has been a rocky one; for American Indian people with an oral tradition, history is as recent as its last telling. Over time, the tribes have developed a great deal of distrust for the federal government. While Federal managers are not responsible for all that has occurred, they must recognize that the federal-tribal relationship did not

begin and will not end with them. While the past can't be changed, the health and productivity of the current relationship is within the control and responsibility of the line officer, who should emphasize the ongoing nature of the relationship.

In addition to the unique federal trust relationship with American Indian tribes, most tribes in the basin have significant land holdings. They are land managers and have a unique understanding of and connection to the land. Furthermore, the federal lands administered by the Forest Service and the BLM were once a part of the aboriginal homeland of American Indian people. The tribal rights and interests associated with the lands and resources have existed and will continue to exist over time. The tribes and the BLM and Forest Service all have a vested interest in working together for the land and resources.

# Appendix 8b

## Tribal Background Information Part B

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### Summary

Appendix 8 is split into two sections. Part A is included with the EIS. Part B includes sections that have been updated; however, they have not changed substantially since they were printed in the Eastside and Upper Columbia River Basin (UCRB) Draft EISs (Eastside Appendix 1-2, UCRB Appendix C); therefore, they are not reprinted here. Appendix 8b provides information about federal court cases with applications for multiple tribes; detailed general information sheets for affected tribes in the project area; a chronology of legal status of American Indian tribes; a list of Tribal Employment Rights Ordinance (TERO) contacts; and a discussion of ethno-habitats.

Appendix 8b (approximately 94 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770; fax (208) 334-1769.

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# Appendix 9

## Additional Aquatics Guidance and USFWS and NMFS Matrices

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# Introduction

The information in this appendix is an integral element to be used in conjunction with Chapter 3 direction. The appendix information supports and guides the objectives and standards in Chapter 3 and is not intended to stand alone.

The first section of this appendix describes one component of the aquatic and riparian strategy for Alternative S1: Riparian Management Objectives (RMOs). The second section describes the Sediment Delivery Influence Area used in Alternative S2 and S3. The last section contains the U.S. Fish and Wildlife Service and National Marine Fisheries Service Matrices of Pathways and Indicators used as an interim procedure to determine project consistency until Watershed Condition Indicators are developed (see Chapter 3 for more information). These matrices were reformatted for the ICBEMP appendix, but the content was not changed.

## Riparian Management Objectives - Alternative S1

In Alternative S1, Riparian Management Objective (RMO) values for stream channel conditions provide criteria to help assess attainment of aquatic and riparian goals as described in Chapter 3. These values provide a description and characterization of watershed, riparian, and stream channel processes and existing conditions that can be used to guide management activity design, implementation, and monitoring. RMOs are not expected to be met instantaneously but rather would be achieved over time.

As indicated below, some RMOs would apply to forested ecosystems, some to rangeland ecosystems, and some to all ecosystems. Actions that reduce habitat quality are inconsistent with the purpose of Alternative S1 direction. However, the intent of RMOs are not to establish a ceiling for what constitutes good habitat conditions. The following statements provide the intent for use of the RMOs and their purpose in a comprehensive conservation program:

1. RMOs are criteria to help evaluate progress towards attainment of watershed, aquatic and riparian goals.
2. RMOs are not to be viewed as independent from other components of the aquatic conservation strategy; rather, they are part of an aquatic conservation program. RMOs are not always sensitive to immediate effects but rather exhibit response to cumulative effects and factors influencing channel history over time.
3. RMOs do not replace state and federal water quality standards promulgated under the federal Clean Water Act or state laws, but they should complement these standards in providing measurable habitat attributes.

In PACFISH (2/24/95) and INFISH (7/28/95), landscape-scale RMO values describing good habitat for anadromous and inland native fish were developed, using stream inventory data for pool frequency, large woody debris, bank stability, lower bank angle, and width-to-depth ratio. Applicable published and non-published scientific literature was used to define favorable water temperatures. All of the described habitat features may not occur in a specific segment of stream within a watershed, but all generally should occur at the watershed scale for stream systems of moderate to large size (3rd to 6th order).

Riparian Management Objective values represent a starting point to describe the desired condition for fish habitat. National Forest and BLM managers are encouraged to establish site-specific RMOs. Riparian Management Objectives should be refined to better reflect conditions that are attainable in a specific watershed or stream reach based on local landform, climate, stream type and valley bottom settings, and potential vegetation. Modification of RMO values in Alternative S1 requires completion of Ecosystem Analysis at the Watershed Scale or site-specific analysis to provide the ecological basis for the change. Rationale supporting these changes and the effects of the changes shall be documented.

Riparian Management Objective values for six environmental features are identified in Table 1. These features are good indicators of ecosystem health, are quantifiable, and are subject to accurate, repeatable measurements. RMOs do not apply to Alternatives S2 or S3.

# Sediment Delivery Influence Area - Alternatives S2 and S3

The *Assessment of Ecosystem Components* identified hillslope steepness as an important biophyscial principle that should be considered in developing a riparian management strategy. As side slopes adjacent to streams steepen, the likelihood of disturbance resulting in discernable instream effects increases. Thus, management activities on steep slopes which increase surface erosion and sediment delivery rates may require design or mitigative features that limit the effect on riparian function and instream habitat. Standard B-S42 addresses this principle and uses relationships developed in the *Assessment of Ecosystem Components*.

The general relationship of slope to sediment travel distance can be used to define an area where sediment transport may be of concern, as shown in Figure 1. This curve is based on data from Idaho batholith soils (Ketcheson and Megahan, 1996); it may over-predict erosional processes for less erodible soils and may under-predict sediment transport for finer particles of eroded material. Figure 1 describes sediment travel distance as a function of slope gradient, for median values of obstructions and source area. For this curve the 90th percentile of volume is used to predict a low risk transport distance that is, on average, exceeded only 10 percent of the time for any given slope. The curve does not predict the volume of sediment reaching a stream or moving a certain distance, but rather predicts probabilities that sediment particles will travel at least as far as the distance calculated using the curve.

Other research (Megahan and Ketcheson 1996) found that in addition to slope, other significant predictors of transport distance were sediment volume, amount of obstructions, and source area. Volume alone accounts for 78 percent of the variance in sediment transport distance in the Megahan and Ketcheson

Table 1. RMO Values for Alternative S1.

Habitat Feature	Values									
Pool Frequency (all systems) Varies by channel width.	Wetted width (feet)	10	20	25	50	75	100	125	150	200
	Pools per mile	96	56	47	26	23	18	14	12	9
Water Temperature	No measurable increase in maximum water temperature (7 day moving average of daily maximum temperature measured as the average of the maximum daily temperature of the warmest consecutive 7 day period). Maximum water temperatures below 59°F within adult bull trout holding habitat and below 48°F within bull trout spawning and rearing habitats.									
	Maximum water temperatures below 64°F within anadromous fish migration and rearing habitats and below 60°F within anadromous fish spawning habitats.									
Large Woody Debris (forested systems)	> 20 pieces per mile; > 12 inch diameter; > 35 foot length.									
Bank Stability (rangeland systems)	> 80 percent stable.									
Lower Bank Angle (rangeland systems)	> 75 percent of banks with <90 degree angle (i.e., undercut).									
Width/Depth Ratio (all systems)	< 10, mean wetted width divided by mean depth.									



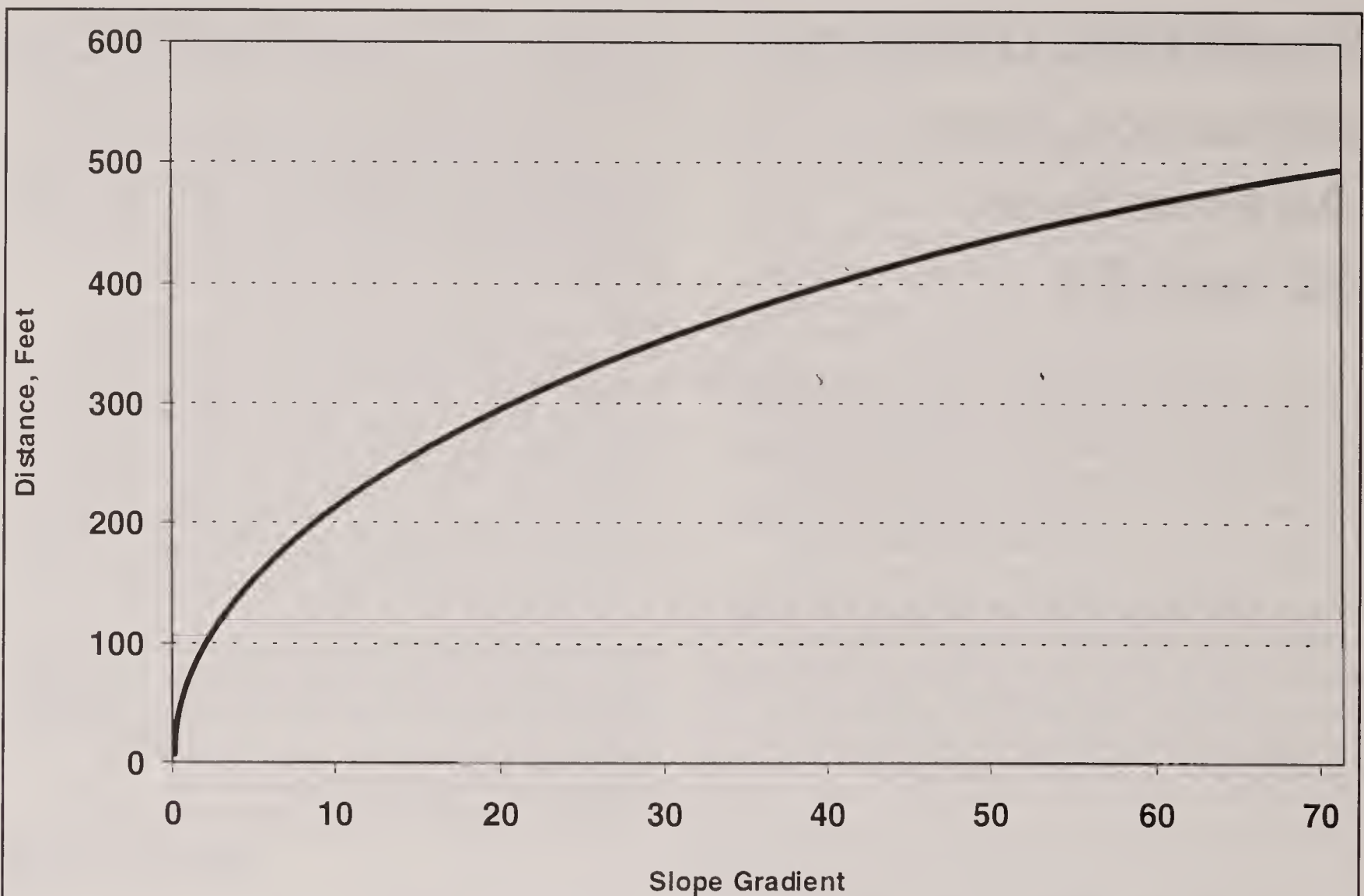


Figure 1. Relationship of Slope to Sediment Distance Using Information from Ketcheson and Megahan (1996).

data set, and is therefore a useful predictor of risk of sediment travel distance exceedance. Different levels of risk can be defined by varying volumes of sediment according to the distribution of the samples in the Megahan and Ketcheson data set.

To implement standard B-S42, field units can either use the relationship in Figure 1 or locally developed sediment delivery relationships to identify the sediment delivery influence area. The sediment delivery influence area is defined as the area adjacent to RCAs where sediment from management activities has a likelihood of being delivered to the RCA. Distances derived from Figure 1 are measured from the edge of

the channel and the area extending beyond the RCA is the sediment delivery influence area and would be managed according to B-S42. When developing local relationships, similar concepts used to develop Figure 1 can be applied to local information (See the *Assessment of Ecosystem Components* for more detail). Important variables to consider when developing local sediment delivery relationships are slope, potential sediment volume, on the ground obstructions, soil characteristics, and sediment source. These relationships should use the best available scientific information. Distances obtained through either method are estimates and may need modification based on site level investigations.

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# USFWS Matrix

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## A Framework To Assist In Making Endangered Species Act Determinations Of Effect For Individual Or Grouped Actions At The Bull Trout Subpopulation Watershed Scale

***Prepared by the US Fish and Wildlife Service (adapted from the National Marine Fisheries Service, February 1998) This document was reformatted for the ICBEMP Supplemental Draft EIS. Content was not changed.***

### Overview

The following framework was designed to facilitate and standardize determinations of effect for Endangered Species Act (ESA) conferences, consultations and permits focusing on bull trout (*Salvelinus confluentus*). We recommend that this framework be applied to individual actions or grouped similar activities at the 5<sup>th</sup> or 6<sup>th</sup> field Hydrologic Unit Code (HUC) watershed scale. Subsequent Conference Reports or Biological Opinions that you will receive from the U.S. Fish and Wildlife Service (USFWS) will address the effects of your actions at the bull trout subpopulation level. Maps of bull trout subpopulation watersheds will be provided to you for your area and generally are similar to the 4<sup>th</sup> field Hydrologic Unit Code (HUC). It will be necessary for you to aggregate your 5<sup>th</sup> or 6<sup>th</sup> field HUC framework determinations to the subpopulation watershed level in any Biological Assessment that you submit.

When USFWS conducts an analysis of a proposed activity or grouped activities, it involves the following steps: (1) define the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline to the species' current status; (3) determine the effects of the proposed or continuing action(s) on listed and proposed species; and (4) determine whether all the life stages and forms of the species can be expected to survive, with an adequate potential for recovery, to be self-sustaining and self-regulating under the effects of the proposed or continuing action(s), the environmental baseline, and any cumulative effects. The last item (item 4) ad-

dresses considerations given during a jeopardy analysis. *Please recognize, however, that this framework document does not address jeopardy or identify the level of take or adverse effects which would constitute jeopardy.* Jeopardy is determined on a case by case basis involving the specific information on habitat conditions and the health and status of the fish population. USFWS is currently preparing a set of guidelines, to be used in conjunction with this document, to help in the determination of jeopardy.

This framework document provides a consistent, logical line of reasoning to aid in determining when and where adverse effects occur and why they occur. It is a framework or template to stimulate discussion among Level 1 and Interdisciplinary teams regarding the influence of important habitat variables or indicators on bull trout populations. It is not an aquatic conservation strategy. *This framework does not replace watershed analysis nor attempt to define data standards.* Using available data, results from watershed analyses, and team discussions, the framework will help the teams arrive at an ecologically defensible and trackable determination of the effects of proposed actions on the species and its habitat.

This framework document contains definitions of ESA effects and examples of effects determinations, a recommended reading list to help in understanding the importance of an indicator on bull trout, a matrix of diagnostics/pathways of effects and indicators of those effects, a checklist for documenting the environmental baseline and effects of the proposed action(s) on the relevant indicators, and a dichoto-



mous key for making determinations of effect and documenting expected incidental take. None of the tools identified in this document are new inventions. The matrix, check list, and dichotomous key format have been adapted from the matrix, check list, and dichotomous key developed by the National Marine Fisheries Service (NMFS) to determine the effects of actions on listed anadromous fish species. Although some identifying words and values in this framework have been changed from those in the NMFS document, the format is very similar. The matrix developed here reflects the information needed to evaluate effects of proposed and on-going land management actions of the U.S. Forest Service and U.S. Bureau of Land Management on the persistence and potential recovery of proposed/listed bull trout subpopulations. The similarity between the NMFS's document and this framework should facilitate a blending of the matrices by Level 1 teams during combined consultation/conference efforts with the two regulatory agencies, as well as formal integration of the matrices by the two agencies in the future.

Using these tools, the Federal agencies and Non-Federal Parties (both will be referred to as evaluators in the remainder of this document) can make determinations of effect for proposed projects (i.e. "no effect" / "may affect" and "may affect, not likely to adversely affect" / "may affect, likely to adversely affect") on listed and proposed species. *As explained below, these determinations of effect will depend on whether a proposed action (or group of actions) hinders the attainment of relevant environmental conditions (identified in the matrix as pathways and indicators) and further impacts the status of a bull trout subpopulation (also identified in the matrix as diagnostics and indicators), and/or results in "take" of a proposed or listed species, as defined in the ESA.*

Finally, this framework is a **draft** document designed to be applied to a wide range of environmental conditions. This means it must be flexible and will be refined. It also means that a certain degree of professional judgement will be required in its application. *There will be circumstances where the numeric values or descriptions in the matrix simply do not apply to a specific watershed, are unavailable, or exist in a different format. In each case, the evaluator will need to provide more ecologically appropriate values using local data when available, including data sources and techniques used, as well as provide adequate documentation and rationale (see amendment to Streamlining direction) that justify changes or deletions of a diagnostic/pathway indicator(s). All documentation must be presented in each associated biological assessment, habitat conservation plan, or other appropriate document. This documentation will be used by USFWS in preparation of a section 7 consulta-*

tion, habitat conservation plan, or other appropriate biologically based document.

## Before You Begin

To facilitate effective use of the framework, it will be necessary to gather and familiarize yourself with several documents and reports ranging in scope from general bull trout life history information to specific stream reach survey information. It would be difficult to even begin to list all the important information sources that can help you better understand the biology of bull trout and its interrelationship with its environment. To begin your information search, any watershed analysis and previous biological assessments pertaining to the watershed under consideration, as well as all the maps, data findings and results, and historical accounts you can gather, will be essential information in assessing your integrated environmental and population baseline and arriving at a biologically sound effects determination.

Below are listed a few sources that may be helpful to you in your information search. Many of those recommended are referred to or cited in the framework.

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# Description of the Matrix

The objective of the “Matrix of Diagnostics/Pathways and Indicators” (USFWS Table 1) is to integrate the biological and habitat conditions to arrive at a determination of the potential affect of land management activities on a proposed or listed species. This matrix is divided into seven overall diagnostics/pathways (major rows in the matrix) and a summary integration diagnostic:

## Species Diagnostics

- ♦ Subpopulation Characteristics

## Habitat Pathways

- ♦ Water Quality
- ♦ Habitat Access
- ♦ Habitat Elements
- ♦ Channel Condition and Dynamics
- ♦ Flow/Hydrology
- ♦ Watershed Conditions

## Habitat and Species`

- ♦ Integration of Species and Habitat Condition

The above were designed to simplify arriving at an effects determination with a firm understanding of the status of the bull trout subpopulation in the watershed being considered for management activities, the environmental baseline (current condition) of the habitat, and how that subpopulation might be affected (beneficially or not) by changes in its habitat as a result of the proposed action(s). It is essential that each diagnostic/pathway be addressed.

The species diagnostic “Subpopulation Characteristics” is designed to help you evaluate the status of the bull trout subpopulation in the area of the proposed action(s) under current habitat conditions. Each of the above listed diagnostic tools relating to habitat represents a pathway by which actions can have potential effects on bull trout. It is essential to have an understanding of both the condition of the habitat and the status of the subpopulation when proposing activities that will change the environmental baseline and potential risk to the species. Integration of these diagnostics and pathways is needed to make an appropriate effects determination.

The diagnostics and pathways are further broken down into “indicators.” Within the habitat pathways, indicators are generally arranged from a finer to a broader scale. For example, under the pathway “Habitat Elements”, the indicators ask you to consider information from the reach level, (substrate embeddedness), to the grouped reach level (large woody debris, pool frequency and quality, large pools), to the entire stream length (off-channel habitat), and finally the complete subpopulation watershed (refugia).

Indicators are generally of two types: (1) metrics that have associated numeric values (e.g. “4 - 9 ° C”); and/or (2) descriptions (e.g. “adequate habitat refugia do not exist”). The purpose of having both types of indicators in the matrix is that numeric data are not always readily available for making determinations or there may be no reliable numeric indicator for a specific environmental or population attribute. In this case, a description of overall condition may be the only appropriate method available.

When a numeric value and a description are combined in the same cell in the matrix, it is because accurate assessment of the indicator requires attention to both. Values and descriptions are presented to stimulate discussion within Level 1 and interdisciplinary teams. They provide a diagnostic tool that should be evaluated for reliability in describing environmental functional relationships specific to the watershed you are considering for management activity. *The numeric values are not presented as absolutes nor to define data standards.* They are presented as diagnostic tools to promote discussion of differences between local data or findings and values suggested in the matrix. If local data relating to a specific indicator is not available for comparison and verification, then proposed management activities should be designed to minimize impacts to that indicator.

If a numeric indicator suggested in the matrix is not functionally attainable given the inherent characteristics of the watershed being considered or if an equivalent value is available using a different field technique, Level 1 and Interdisciplinary teams should replace the numeric value with local data and professional judgement. When this occurs, changes must be accompanied by rigorous discussion within the team, which is integrated into adequate documentation complete with supportive local data and the technique used to compile the data, and/or scientifically supported reasoning, logic, or professional judgement for the change. Likewise, if a team decides not to use all indicators in a diagnostic or pathway, the team must provide defensible and trackable documentation on why an indicator was not considered.



Diagnostics, pathways, and indicators may overlap in their scope and data components. This is to provide a cross check that ensures potential effects are viewed from more than one perspective. Likewise, it provides an avenue for integration among habitat variables and between the condition of a bull trout subpopulation and its habitat.

The columns in the matrix correspond to levels of condition of the indicator. There are three condition levels: "functioning appropriately," "functioning at risk," and "functioning at unacceptable risk." These three categories of function are defined for each indicator in the "Matrix of Diagnostics/Pathways and Indicators". In concept, indicators in a watershed are "functioning appropriately" when they maintain strong and significant populations that are interconnected and promote recovery of a proposed or listed species or its critical habitat to a status that will provide self-sustaining and self-regulating populations. When the indicators are "functioning at risk", they provide for persistence of the species but in more isolated populations and may not promote recovery of a proposed or listed species or its habitat without active or passive restoration efforts. "Functioning at unacceptable risk" suggests the proposed or listed species continues to be absent from historical habitat, or is rare or being maintained at a low population level; although the habitat may maintain the species at this low persistence level, active restoration is needed to begin recovery of the species.

## **Description of the Checklist**

The "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators" (USFWS Table 2) is designed to be used in conjunction with the matrix. The checklist has six columns. The first three describe the condition of each indicator (which when taken together encompass the environmental baseline and condition of the bull trout subpopulation), and the second three describe the effects of the proposed action(s) on each indicator. As with the matrix, rigorous discussion among Level 1 or Interdisciplinary teams should occur when making checklist selections. Likewise, documentation and rationale supporting each checklist selection must be made available.

## **Description of the Dichotomous Key for Making ESA Determinations of Effect and Documentation of Expected Incidental Take**

The "Dichotomous Key for Making ESA Determinations of Effect" (USFWS Table 3) is designed to aid in determinations of effect for proposed actions that require a section 7 consultation/conference or permit under Section 10 of the ESA. Once the matrix has been modified with watershed specific local data (if necessary) to meet the needs of the evaluators, and the checklist has been discussed and filled out, the evaluators should use the key to help make their ESA determinations of effect. If it is determined that the proposed actions will result in a "take", identify the expected "take" on the "Documentation of Expected Incidental Take" form that accompanies the Dichotomous Key.

# How to Use the Matrix, Checklist, and Dichotomous Key

1. Group similar projects when possible that are proposed within a 5<sup>th</sup> or 6<sup>th</sup> field HUC watershed.

2. Using the Matrix provided (or a version modified and documented by the evaluator) **evaluate environmental baseline conditions** (mark on checklist), use all 7 pathways (identified in the matrix). Summarize the matrix in the "Habitat and Species: Integration of Habitat and Species Conditions" indicator.

3. **Evaluate effects of the proposed action** at both the 5<sup>th</sup> or 6<sup>th</sup> and watershed levels using the matrix. Do they restore, maintain or degrade existing baseline conditions? Mark on checklist and provide written logic and rationale.

## Matrix of Diagnostics/Pathways and Indicators

Use to describe the environmental and subpopulation baseline conditions.

Subpopulation characteristics, water quality, habitat access, habitat elements, channel condition and dynamics, flow/hydrology, watershed condition, integration of species, and habitat conditions .

and

Then use the same Diagnostic/Pathways and Indicators to evaluate the proposed projects on species and its habitat.



Mark Results on Checklist



4. Take the checklist you marked and the dichotomous key and answer the questions in the key, substantiated by a written rationale and logic, **to reach a determination of effects.**

## Checklist

### Environmental Baseline

### Effects of the Action

Funct.  
Appro-

Funct.  
at Risk

Funct. at  
Unaccept-

Maintain

Restore

Degrade

Use professional judgement, level 1 team discussions, written documentation and rationale, and the checklist to work through the dichotomous key.

(Note: Actual Matrix is USFWS Table 1. Actual Checklist in USFWS Table 2. Actual Dichotomous key in USFWS Table 3.)

## Dichotomous Key

Yes/No

No Effect

May Effect

Not Likely to Adversely Affect

Likely to Adversely Affect



# Definitions of ESA Effects Thresholds and Examples

Following are definitions of ESA effects (sources in *italics*):

## **“No effect”**

This determination is only appropriate “if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect or an effect that is unlikely to occur.” (From *“Common flaws in developing an effects determination”*, Olympia Field Office, U.S. Fish and Wildlife Service). Furthermore, actions that result in a “beneficial effect” do not qualify as a no effect determination. If a “no effect” determination is derived, conference/consultation does not need to proceed, but it is recommended that these determinations be shared within the Level 1 team. Documentation to substantiate this determination must be filed in evaluator’s records.

## **“May affect, not likely to adversely affect”**

“The appropriate conclusion when effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.” (From *“Draft Endangered Species Consultation Handbook; Procedures for Conducting Section 7 Consultations and Conferences,”* USFWS/NMFS, 1994). The term “negligible” has been used in many ESA consultations involving anadromous fish in the Snake River basin. The definition of this term is the same as “insignificant.” Consultation/conference is required for this effect determination, but can proceed as informal.

## **“May affect, likely to adversely affect”**

Unfortunately, there is no definition of adverse effects in the ESA or its implementing regulations. The draft Endangered Species Consultation Handbook (NMFS/USFWS, November 1994) provides this definition for “Is likely to adversely affect” - the appropriate conclusion if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions. In the event the overall effect of the proposed action is beneficial to the listed species or critical habitat, but is also likely to cause some adverse effects, then the proposed action ‘is likely to adversely affect’ the listed species or critical habitat. An “is likely to adversely affect” determination requires formal section 7 consultation.

The following is a definition specific to anadromous salmonids developed by NMFS, the FS, and the BLM during the PACFISH consultation and is given as example: “Adverse effects include short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage. Adverse effects to designated critical habitat include effects to any of the essential features of critical habitat that would diminish the value of the habitat for the survival and recovery of listed anadromous salmonids” (From *NMFS’ Pacfish Biological Opinion*, 1/23/95). Interpretation of part of the preceding quotation has been problematic. The statement “...impacts of an individual or cumulative nature...” has often been applied only to actions and impacts, not organisms. NMFS’ concern with this definition is that it does not clearly state that the described impacts include those to individual eggs or fish. However, this definition is useful if it is applied on the individual level as well as on the subpopulation and population levels.

For the purposes of Section 7, any action which has more than a negligible potential to result in “take” is likely to adversely affect a proposed/listed species. It is not possible for NMFS or USFWS to concur on a “not likely to adversely affect” determination if the proposed action will cause take of the listed species. Take can be authorized in the Incidental Take Statement of a Biological Opinion after the anticipated extent and amount of take has been described, and the effects of the take are analyzed with respect to jeopardizing the species or adversely modifying critical



habitat. *Take, as defined in the ESA, clearly applies to the individual level, thus actions that have more than a negligible potential to cause take of individual eggs and/or fish are "likely to adversely affect."*

### **"Likely to jeopardize the continued existence of"**

The regulations define jeopardy as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02).

### **"Take"**

The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS further defines "harm" to include "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

## **Examples of Effects Determinations**

### **"No effect"**

USFWS is encouraging evaluators to conference/consult at the subpopulation or watershed scale (i.e., on all proposed actions in a particular watershed or within the range of a bull trout subpopulation) rather than on individual projects. Due to the strict definition of "no effect" (above), the interrelated nature of in-stream conditions and watershed conditions, and the watershed scale of these conferences, consultations, and activities, "no effect" determinations for all actions in a watershed will be unusual when proposed/listed species are present in or downstream from a given watershed. This is reflected in the dichotomous key, however the evaluator may identify some legitimate exceptions to this general rule.

### **Example**

The proposed project is in a watershed where available monitoring information indicates that in-stream habitat is functioning appropriately and riparian vegetation is at or near potential. The proposed activity will take place on stable soils and will not result in increased sediment production. No activity will take place in the riparian zone and no listed/proposed species or designated critical habitat exist in the watershed or immediately downstream of the watershed where the activity will take place.

### **"May affect, not likely to adversely affect"**

### **Example**

The proposed action is in a watershed where bull trout exists. Available monitoring information indicates that in-stream habitat is functioning appropriately and riparian vegetation is at or near potential. Past monitoring indicates that this type of action has led to the present condition (i.e., timely recovery has been achieved with the kind of management proposed in the action). No activity will take place in the riparian zone. Given available information, the potential for take to occur is negligible.

### **"May affect, likely to adversely affect"**

### **Example**

The proposed action is in a watershed that has a remnant resident population of bull trout in very low numbers and the migratory form is no longer present. The watershed is in relatively good condition, however a few in-stream indicators show degradation, such as excess fine sediment, moderate cobble embeddedness, and poor pool frequency/quality. If the action will further degrade any of these indicators, the determination is clearly "likely to adversely affect".

A less obvious example would be a proposed action in the same watershed that is designed to improve baseline conditions, such as road obliteration or culvert repair. Even though the intent is to improve the degraded conditions over the long-term, if any short-term impacts (such as temporary sedimentation) will cause take (adverse effects), then the determination is "likely to adversely affect."



# Sample Species Narrative

## **Bull Trout (*Salvelinus confluentus*)**

**Endangered Species Act Status:** Proposed threatened Columbia River population segment and endangered Klamath River population segment, June 10, 1997. All life forms are included in this proposal.

## **Description**

For years, the bull trout and Dolly Varden (*Salvelinus malma* Girard) were combined under one name, the Dolly Varden (*Salvelinus malma* Walbaum). In 1991, with the support of the American Fisheries Society, they became two distinct species. A couple of the most useful characteristics in separating the two species are the shape and size of the head (Cavender 1978). The head of a bull trout is more broad and flat on top, being hard to the touch, unlike Dolly Varden. Bull trout have an elongated body, somewhat rounded and slightly compressed laterally, and covered with cycloid scales numbering 190-240 along the lateral line. The mouth is large with the maxilla extending beyond the eye and with well developed teeth on both jaws and head of the vomer (none on the shaft). Bull trout have 11 dorsal fin rays, 9 anal fins, and the caudal fin is slightly forked. Although they are often olive green to brown with paler sides, color is variable with locality and habitat. Their spotting pattern is easily recognizable showing pale yellow spots on the back, and pale yellow and orange or red spots on the sides. Bull trout fins are tinged with yellow or orange, while the pelvic, pectoral, and anal fins have white margins. There should be no black or dark markings on the fins.

## **Historical and Current Distribution**

The historical range of bull trout was restricted to North America (Cavender 1978; Haas and McPhail 1991). Bull trout have been recorded from the McCloud River in northern California, the Klamath River basin in Oregon and throughout much of interior Oregon, Washington, Idaho, western Montana, and British Columbia, and extended into Hudson Bay and the St. Mary's River Saskatchewan.

Bull trout are believed to be a glacial relict (McPhail and Lindsey 1986), and their broad distribution has probably contracted and expanded periodically with natural climate change (Williams and others, in press). Genetic variation suggests an extended and evolutionarily important isolation between populations in the Klamath and Malheur Basins and those in the Columbia River basin (Leary and others 1993). Populations within the Columbia River basin are more closely allied and are thought to have expanded from common glacial refugia or to have maintained higher levels of gene flow among populations in recent geologic time (Williams and others, in press).

It is unlikely that bull trout occupied all of the accessible streams at any one time. Distribution of existing populations is often patchy even where numbers are still strong and habitat is in good condition (Rieman and McIntyre 1993; Rieman and McIntyre 1995). Habitat preferences or selection is likely important (Dambacher and others, in press; Goetz 1994; Rieman and McIntyre 1995); but more stochastic extirpation and colonization processes may influence distribution even within suitable habitats (Rieman and McIntyre 1995).

Even though bull trout may move throughout whole river basins seasonally, spawning and juvenile rearing appear to be limited to the coldest streams or stream reaches. The lower limits of habitat used by bull trout are strongly associated with gradients in elevation, longitude, and latitude, that likely approximate a gradient in climate across the Basin (Goetz 1994). The patterns indicate that spatial and temporal variation in climate may strongly influence habitat available to bull trout (see Meisner 1990 for an example with brook trout). While temperatures are probably suitable throughout much of the northern portion of the range, predicted spawning and rearing habitat are restricted to increasingly isolated high elevation or headwater "islands" toward the south (Goetz 1994; Rieman and McIntyre 1995).

Bull trout are now extinct in California and only remnant populations are found in much of Oregon (Ratliff and Howell 1992). A small population still exists in the headwaters of the Jarbidge River, Nevada which represents the present southern limit of the species range. Bull trout are known or predicted to occur in 45 percent of watersheds in the historical range and to be absent in 55 percent.

Migratory life histories have been lost or limited throughout the range (for example, Goetz 1994; Jakober 1995; Montana Bull Trout Scientific Committee, in preparation; Pratt and Huston 1993; Ratliff and Howell 1992; Rieman and McIntyre 1993, 1995). There is evidence of declining trends in some popula-



tions (Mauser and others 1988; Pratt and Huston 1993; Schill 1992; Weaver 1992) and extirpations of local populations are reportedly widespread.

## Life History Characteristics

Bull trout spawn from August through November (McPhail and Murray 1979; Pratt 1992). Hatching may occur in winter or early spring, but alevins may stay in the gravel for an extended period after yolk absorption (McPhail and Murray 1979). Growth, maturation, and longevity vary with environment, first spawning is often noted after age four, with individuals living 10 or more years (Rieman and McIntyre 1993).

Two distinct life-history forms, migratory and resident, occur throughout the range of bull trout (Pratt 1992; Rieman and McIntyre 1993). Migratory forms rear in natal tributaries before moving to larger rivers (fluvial form) or lakes (adfluvial form) or the ocean (anadromous) to mature. Migratory bull trout may use a wide range of habitats ranging from 2<sup>nd</sup> to 6<sup>th</sup> order streams and varying by season and life stage. Seasonal movements may range up to 300 km as migratory fish move from spawning and rearing areas into overwinter habitat in downstream reaches of large basins (Bjornn and Mallet 1964; Elle and others 1994). The resident form may be restricted to head-water streams throughout life. Both forms are believed to exist together in some areas, but migratory fish may dominate populations where corridors and subadult rearing areas are in good condition (Rieman and McIntyre 1993).

## Habitat Relationships

Bull trout appear to have more specific habitat requirements than other salmonids (Rieman and McIntyre 1993). Habitat characteristics including water temperature, stream size, substrate composition, cover and hydraulic complexity have been associated with the distribution and abundance (Dambacher and other, in press; Jakober 1995; Rieman and McIntyre 1993).

Stream temperatures and substrate composition may be particularly important characteristics of suitable habitats. Bull trout have repeatedly been associated with the coldest stream reaches within basins. Goetz (1994) did not find juvenile bull trout in water temperatures above 12.0°C. The best bull trout habitat in several other Oregon streams was where water temperature seldom exceeded 15°C (Buckman et al. 1992; Ratliff 1992; Ziller 1992). Temperature also

appears to be a critical factor in the spawning and early life history of bull trout. Bull trout in Montana spawned when temperatures dropped below 9 to 10°C (Fraley and Shepard 1989). McPhail and Murray (1979) reported 9°C as the threshold temperature to initiate spawning for British Columbia bull trout. Temperatures fell below 9°C before spawning began in the Metolius River, Oregon (Riehle 1993). Survival of bull trout eggs varies with water temperature (McPhail and Murray 1979). They reported that 0-20%, 60-90%, and 80-95% of the bull trout eggs from British Columbia survived to hatching in water temperatures of 8-10°C, 6°C, and 2-4°C, respectively. Weaver and White (1985) found that 4-6°C was needed for egg development for Montana bull trout. Temperature may be strongly influenced by land management (Henjum and others 1994) and climate change; both effects may play an important role in the persistence of bull trout.

Bull trout are more strongly tied to the stream bottom and substrate than other salmonids (Pratt 1992). Substrate composition has repeatedly been correlated with the occurrence and abundance of juvenile bull trout (Dambacher and others in press; Rieman and McIntyre 1993) and spawning site selection by adults (Graham and others 1981; McPhail and Murray 1979). Fine sediments can influence incubation survival and emergence success (Weaver and White 1985), but might also limit access to substrate interstices that are important cover during rearing and overwintering (Goetz 1994; Jakober 1995).

## Key Factors

Angling is a factor influencing the current status of bull trout. Bull trout may be vulnerable to over-harvest (Ratliff and Howell 1992; Rieman and Lukens 1979). Poaching is viewed as an important cause of mortality, especially in accessible streams that support large migratory fish (N. Horner, Idaho Department of Fish and Game and J. Vasho, Montana Department of Fish, Wildlife and Parks, pers. comm.).

Watershed disruption is a second factor that has played a role in the decline of bull trout. Changes in or disruptions of watershed processes likely to influence characteristics of stream channels are also likely to influence the dynamics and persistence of bull trout populations. Bull trout have been more strongly associated with pristine or only lightly disturbed basins (Brown 1992; Clancy 1993; Cross and Everest 1995; Dambacher and others, in press; Huntington 1995; Ratliff and Howell 1992).



Patterns of stream flow and the frequency of extreme flow events that influence substrates are anticipated to be important factors in population dynamics (Rieman and McIntyre 1993). With overwinter incubation and a close tie to the substrate, embryos and juveniles may be particularly vulnerable to flooding and channel scour associated with the rain-on-snow events common in some parts of the range within the belt geography of northern Idaho and northwestern Montana (Rieman and McIntyre 1993). Channel dewatering tied to low flows and bed aggradation has also blocked access for spawning fish resulting in year class failures (Weaver 1992).

Changes in sediment delivery, aggradation and scour, wood loading, riparian canopy and shading or other factors influencing stream temperatures, and the hydrologic regime (winter flooding and summer low flow) are all likely to affect some, if not most, populations. Significant long-term changes in any of these characteristics or processes represent important risks for many remaining bull trout populations. Populations are likely to be most sensitive to changes that occur in headwater areas encompassing critical spawning and rearing habitat and remnant resident populations.

Introduced species are a third factor influencing bull trout. More than 30 introduced species occur within the present distribution of bull trout. Some introductions like kokanee may benefit bull trout by providing forage (Bowles and others 1991). Others such as brown, brook, and lake trout are thought to have depressed or replaced bull trout populations (Dambacher and others, in press; Donald and Alger 1992; Howell and Buchanan 1992; Kanda and others, in press; Leary and others 1993; Ratliff and Howell

1992). Brook trout are seen as an especially important problem (Kanda and others, in press; Leary and others 1993) and may progressively displace bull trout through hybridization and higher reproductive potential (Leary and others 1993). Brook trout now occur in the majority of the watersheds representing the current range of bull trout. Introduced species may pose greater risks to native species where habitat disturbance has occurred (Hobbs and Huenneke 1992).

Isolation and fragmentation are the fourth factor likely to influence the status of bull trout. Historically bull trout populations were well connected throughout the Basin. Habitat available to bull trout has been fragmented, and in many cases populations have been isolated entirely. Dams have isolated whole subbasins throughout the Basin (see for example, Brown 1992; Kanda and other, in press; Pratt and Huston 1993; Rieman and McIntyre 1995). Irrigation diversions, culverts, and degraded mainstem habitats have eliminated or seriously depressed migratory life histories effectively isolating resident populations in headwater tributaries (Brown 1992; Montana Bull Trout Scientific Committee, in preparation; Ratliff and Howell 1992; Rieman and McIntyre 1993). Introduced species like brook trout may displace bull trout in lower stream reaches further reducing the habitat available in many remaining headwater areas (Adams 1994; Leary and others 1993). Loss of suitable habitat through watershed disturbance may also increase the distance between good or refuge habitats and strong populations thus reducing the likelihood of effective dispersal (Frissell and others 1993).

# References

Much of the narrative was taken from Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Chapter 4: Broadscale Assessment of Aquatic Species and Habitats. In T.M. Quigley and S. J. Arbelbide eds "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III". U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405). For complete citations, refer to that document.

Other references used but not contained in Lee and others 1997:

Brown, C. J. D. 1971. Fishes of Montana. The Endowment and Research Foundation, Montana State University, Bozeman, MT.

Cavender, T.M. 1978. Taxonomy and Distribution of the Bull Trout, *Salvelinus confluentus* (Suckley), from the American Northwest. California Fish and Game 64(3): 139-174.

Simpson, J. C. and R. L White 1982. Fishes of Idaho. University Press of Idaho, Moscow, ID.



## USFWS Table 1. Matrix of Diagnostics/Pathways and Indicators.

*The values of criteria presented here are NOT absolute. They may be adjusted for local watersheds given supportive documentation.*

Diagnostic or Pathway	Indicators	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
<b>Species</b>				
Subpopulation Characteristics Within Subpopulation Watersheds	Subpopulation Size	Mean total subpopulation size or local habitat capacity more than several thousand individuals. All life stages evenly represented in the subpopulation. <sup>1</sup>	Adults in subpopulation are <500 but >50. <sup>1</sup>	Adults in subpopulation are <50. <sup>1</sup>
	Growth and Survival	Subpopulation has the resilience to recover from short-term disturbances (e.g., catastrophic events, etc.) or subpopulation declines within 1 to 2 generations (5 to 10 years). <sup>1</sup> The subpopulation is characterized as increasing or stable. At least 10 years of data support this estimate. <sup>2</sup>	When disturbed, the subpopulation will not recover to predisturbance conditions within 1 generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend. <sup>1</sup> At least 10 years of data support this characterization. <sup>2</sup> If less data are available and a trend cannot be confirmed, a subpopulation will be considered at risk until enough data are available to accurately determine its trend.	The subpopulation is in rapid decline or is maintaining at alarmingly low numbers. Under current management, the subpopulation condition will not improve within 2 generations (5 to 10 years). <sup>1</sup> This is supported by a minimum of 5 years of data.
	Life History Diversity and Isolation	The migratory form is present and the subpopulation exists in close proximity to other spawning and rearing groups. Migratory corridors and rearing habitat (lake or larger river) are in good to excellent condition for the species. Neighboring subpopulations are large with high likelihood of producing surplus individuals or straying adults that will mix with other subpopulation groups. <sup>1</sup>	The migratory form is present but the subpopulation is not close to other subpopulations or habitat disruption has produced a strong correlation among subpopulations that do exist in proximity to each other. <sup>1</sup>	The migratory form is absent and the subpopulation is isolated to the local stream or a small watershed not likely to support more than 2,000 fish. <sup>1</sup>
	Persistence and Genetic Integrity	Connectivity is high among multiple (5 or more) subpopulations with at least several thousand fish each. Each of the relevant subpopulations has a low risk of extinction. <sup>1</sup> The probability of hybridization or displacement by competitive species is low to nonexistent.	Connectivity among multiple subpopulations does occur, but habitats are more fragmented. Only one or two of the subpopulations represent most of the fish production. <sup>1</sup> The probability of hybridization or displacement by competitive species is imminent, although few documented cases have occurred.	Little or no connectivity remains for refounding subpopulations in low numbers, in decline, or nearing extinction. Only a single subpopulation or several local populations that are very small or that otherwise are at high risk remain. <sup>1</sup> Competitive species readily displace bull trout. The probability of hybridization is high and documented cases have occurred.
<b>Habitat</b>				
Water Quality	Temperature	Seven-day average maximum temperature in a reach during the following life history stages: <sup>1,3</sup> incubation 2 - 5°C rearing 4 - 12 °C spawning 4 - 9°C also temperatures do not exceed 15°C in areas used by adults during migration (no thermal barriers).	Seven-day average maximum temperature in a reach during the following life history stages: <sup>1,3</sup> incubation <2°C or 6°C rearing <4°C or 13 - 15 °C spawning <4°C or 10°C also temperatures in areas used by adults during migration sometimes exceeds 15°C.	Seven-day average maximum temperature in a reach during the following life history stages: <sup>1,3</sup> incubation <1°C or >6°C rearing >15 °C spawning <4 °C or > 10°C also temperatures in areas used by adults during migration regularly exceed 15°C (thermal barriers present).

	Sediment (In areas of spawning and incubation; rearing areas will be addressed under isubstrate embeddedness.i)	Similar to chinook salmon: <sup>1</sup> for example, < 12% fines (<0.85mm) in gravel <sup>4</sup> ; <20% surface fines of <6mm. <sup>5,6</sup>	Similar to chinook salmon <sup>1</sup> : for example, 12-17% fines (<0.85mm) in gravel <sup>4</sup> ; 12-20% surface fines. <sup>7</sup>	Similar to chinook salmon <sup>1</sup> : for example, >17% fines (<0.85mm) in gravel <sup>4</sup> ; >20% fines at surface or depth in spawning habitat. <sup>7</sup>																				
	Chemical Contamination/Nutrients	Low levels of chemical contamination from agricultural, industrial, and other sources; no excess nutrients, no CWA 303d designated reaches. <sup>8</sup>	Moderate levels of chemical contamination from agricultural, industrial, and other sources; some excess nutrients, 1 CWA 303d designated reach. <sup>8</sup>	High levels of chemical contamination from agricultural, industrial, and other sources; high levels of excess nutrients, more than 1 CWA 303d designated reach. <sup>8</sup>																				
Habitat Access	Physical Barriers (Address subsurface flows impeding fish passage under the pathway iflow/hydrology.i)	Man-made barriers present in watershed allow upstream and downstream fish passage at all flows.	Man-made barriers present in watershed do not allow upstream and/or downstream fish passage at base/low flows.	Man-made barriers present in watershed do not allow upstream and/or downstream fish passage at a range of flows.																				
Habitat Elements	Substrate Embeddedness in Rearing Areas (Spawning and incubation areas were addressed under the indicator isediment.i)	Reach embeddedness <20%. <sup>9,10</sup>	Reach embeddedness 20-30%. <sup>9,10</sup>	Reach embeddedness >30%. <sup>4,10</sup>																				
	Large Woody Debris	Current values are being maintained at >80 pieces/mile that are >24 inches diameter and >50 feet length on the coast, <sup>9</sup> or >20 pieces/ mile >12 inches diameter >35 feet length on the eastside; <sup>11</sup> also adequate sources of woody debris are available for both long- and short-term recruitment.	Current levels are being maintained at minimum levels desired for ifunctioning appropriately,î but potential sources for long-term woody debris recruitment are lacking to maintain these minimum values.	Current levels are not at those desired values for ifunctioning appropriately,î and potential sources of woody debris for short- and/or long-term recruitment are lacking.																				
	Pool Frequency and Quality	Pool frequency in a reach closely approximates: <sup>5</sup> <table><tr><td>Wetted width (feet)</td><td>#pools/mile</td></tr><tr><td>0 - 5</td><td>39</td></tr><tr><td>5 - 10</td><td>60</td></tr><tr><td>10 - 15</td><td>48</td></tr><tr><td>15 - 20</td><td>39</td></tr><tr><td>20 - 30</td><td>23</td></tr><tr><td>30 - 35</td><td>18</td></tr><tr><td>35 - 40</td><td>10</td></tr><tr><td>40 - 65</td><td>9</td></tr><tr><td>65 - 100</td><td>4</td></tr></table> (Can use formula: pools/mi = 5,280/wetted channel width #channel widths per pool); also, pools have good cover and cool water <sup>4</sup> , and only minor reduction of pool volume by fine sediment.	Wetted width (feet)	#pools/mile	0 - 5	39	5 - 10	60	10 - 15	48	15 - 20	39	20 - 30	23	30 - 35	18	35 - 40	10	40 - 65	9	65 - 100	4	Pool frequency is similar to values in ifunctioning appropriately,î but pools have inadequate cover/temperature, <sup>4</sup> and/or there has been a moderate reduction of pool volume by fine sediment.	Pool frequency is considerably lower than values desired for ifunctioning appropriately," also cover/temperature is inadequate, <sup>4</sup> and there has been a major reduction of pool volume by fine sediment.
Wetted width (feet)	#pools/mile																							
0 - 5	39																							
5 - 10	60																							
10 - 15	48																							
15 - 20	39																							
20 - 30	23																							
30 - 35	18																							
35 - 40	10																							
40 - 65	9																							
65 - 100	4																							
	Large Pools (In adult holding, juvenile rearing, and overwintering reaches where streams are >3m in wetted width at baseflow.)	Each reach has many large pools >1 meter deep. <sup>4</sup>	Reaches have few large pools (>1 meter) present. <sup>4</sup>	Reaches have no deep pools (>1 meter). <sup>4</sup>																				
	Off-channel Habitat (See reference 18 for identification of these characteristics.)	Watershed has many ponds, oxbows, backwaters, and other off-channel areas with cover; and side-channels are low energy areas. <sup>4</sup>	Watershed has some ponds, oxbows, backwaters, and other off-channel areas with cover; but side-channels are generally high energy areas. <sup>4</sup>	Watershed has few or no ponds, oxbows, backwaters, or other off-channel areas <sup>4</sup>																				



USFWS Table 1. Matrix of Diagnostics/Pathways and Indicators. (continued)

The values of criteria presented here are NOT absolute. They may be adjusted for local watersheds given supportive documentation.

Diagnostic or Pathway	Indicators	Functioning Appropriately	Functioning at Risk	Functioning at Unacceptable Risk
Channel Condition & Dynamics	Refugia (See Checklist footnotes for definition of this indicator.)	Habitats capable of supporting strong and significant populations are protected and are well distributed and connected for all life stages and forms of the species. <sup>12, 13</sup>	Habitats capable of supporting strong and significant populations are insufficient in size, number, and connectivity to maintain all life stages and forms of the species. <sup>12, 13</sup>	Adequate habitat refugia do not exist. <sup>12</sup>
	Average Wetted Width/ Maximum Depth Ratio in Scour Pools in a Reach	<10 <sup>7, 5</sup>	11 - 20 <sup>5</sup>	>20 <sup>5</sup>
	Streambank Condition	>80% of any stream reach has >90% stability. <sup>5</sup>	50 - 80% of any stream reach has >90% stability. <sup>5</sup>	<50% of any stream reach has >90% stability <sup>5</sup>
	Floodplain Connectivity	Off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation, and succession.	Reduced linkage of wetland, floodplains, and riparian areas to main channel; overbank flows are reduced relative to historical frequency, as evidenced by moderate degradation of wetland function, riparian vegetation/succession.	Severe reduction in hydrologic connectivity between off-channel, wetland, floodplain and riparian areas; wetland extent drastically reduced and riparian vegetation/succession altered significantly.
Flow/Hydrology	Change in Peak/Base Flows	Watershed hydrograph indicates peak flow, base flow, and flow timing characteristics comparable to an undisturbed watershed of similar size, geology, and geography.	Some evidence of altered peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology, and geography.	Pronounced changes in peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology, and geography.
	Increase in Drainage Network	Zero or minimum increases in active channel length correlated with human caused disturbance.	Low to moderate increase in active channel length correlated with human caused disturbance.	Greater than moderate increase in active channel length correlated with human caused disturbance.
Watershed Conditions	Road Density & Location	<1mi/mi <sup>2</sup> ; <sup>13</sup> no valley bottom roads	1 - 2.4 mi/mi <sup>2</sup> ; <sup>13</sup> some valley bottom roads.	>2.4 mi/mi <sup>2</sup> ; <sup>13</sup> many valley bottom roads.
	Disturbance History	<15% ECA of entire watershed with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area. For NWFP area there is an additional criteria of 15% LSOG in watersheds. <sup>14</sup>	<15% ECA of entire watershed but disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area there is an additional criteria of 15% LSOG in watersheds. <sup>14</sup>	>15% ECA of entire watershed and disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; does not meet NWFP standard for LSOG.
	Riparian Conservation Areas  (RHCA - PACFISH and INFISH)  (Riparian Reserves - Northwest Forest Plan)	The Riparian Conservation Areas provide adequate shade, large woody debris recruitment, habitat protection, connectivity in subwatersheds, and buffers or include known refugia for sensitive aquatic species (>80% intact) and adequately buffer impacts on rangelands: percent similarity of riparian vegetation to the potential natural community/composition >50%. <sup>15</sup>	Moderate loss of connectivity or function (shade, LWD recruitment, etc.) of riparian conservation areas, or incomplete protection of habitats and refugia for sensitive aquatic species (70-80% intact), and adequately buffer impacts on rangelands: percent similarity of riparian vegetation to the potential natural community/composition 25-50% or better. <sup>15</sup>	Riparian conservation areas are fragmented, poorly connected, or provides inadequate protection of habitats for sensitive aquatic species (<70% intact, refugia does not occur), and adequately buffer impacts on rangelands: percent similarity of riparian vegetation to the potential natural community/composition <25%. <sup>15</sup>

Disturbance Regime	Environmental disturbance is short lived; predictable hydrograph, high quality habitat and watershed complexity providing refuge and rearing space for all life stages or multiple life-history forms. <sup>1</sup> Natural processes are stable.	Scour events, debris torrents, or catastrophic fire are localized events that occur in several minor parts of the watershed. Resiliency of habitat to recover from environmental disturbances is moderate.	Frequent flood or drought producing highly variable and unpredictable flows, scour events, debris torrents, or high probability of catastrophic fire exists throughout a major part of the watershed. The channel is simplified, providing little hydraulic complexity in the form of pools or side channels. <sup>1</sup> Natural processes are unstable.
Species and Habitat			
Integration of Species and Habitat Conditions	Habitat quality and connectivity among subpopulations is high. The migratory form is present. Disturbance has not altered channel equilibrium. Fine sediments and other habitat characteristics influencing survival or growth are consistent with pristine habitat. The subpopulation has the resilience to recover from short-term disturbance within 1 to 2 generations (5 to 10 years). The subpopulation is fluctuating around an equilibrium or is growing. <sup>1</sup>	Fine sediments, stream temperatures, or the availability of suitable habitats have been altered and will not recover to predisturbance conditions within one generation (5 years). Survival or growth rates have been reduced from those in the best habitats. The subpopulation is reduced in size, but the reduction does not represent a long-term trend. The subpopulation is stable or fluctuating in a downward trend. Connectivity among subpopulations occurs but habitats are more fragmented. <sup>1</sup>	Cumulative disruption of habitat has resulted in a clear declining trend in the subpopulation size. Under current management, habitat conditions will not improve within two generations (5 to 10 years). Little or no connectivity remains among subpopulations. The subpopulation survival and recruitment responds sharply to normal environmental events. <sup>1</sup>

<sup>1</sup> Rieman, B.E. and J.D. McIntyre. 1993. Demographic and habitat requirements for conservation of bull trout. U.S.D.A. Forest Service, Intermountain Research Station, Boise, ID

<sup>2</sup> Rieman, B.E. and D.L. Meyers. 1997. Use of redd counts to detect trends in bull trout (*Salvelinus confluentus*) populations. *Conservation Biology* 11(4): 1015-1018

<sup>3</sup> Buchanan, D.V. and S.V. Gregory. 1997. Development of water temperature standards to protect and restore habitat for bull trout and other cold water species in Oregon. In W.C. Mackay, M.K. Brewin, and M. Monita, eds. *Friends of the Bull Trout Conference Proceedings*. P8.

<sup>4</sup> Washington Timber/Fish Wildlife Cooperative Monitoring Evaluation and Research Committee, 1993. *Watershed Analysis Manual (Version 2.0)*. Washington Department of Natural Resources.

<sup>5</sup> Overton, C.K., J.D. McIntyre, R. Armstrong, S.L. Whitwell, and K.A. Duncan. 1995. *User's guide to fish habitat: descriptions that represent natural conditions in the Salmon River Basin, Idaho*. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-322.

<sup>6</sup> Overton, C.K., S.P. Wollrab, B.C. Roberts, and M.A. Radko. 1997. *R1/R4 (Northern/Intermountain Regions) Fish and Fish Habitat Standard Inventory Procedures Handbook*. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, Gen Tech. Rep. INT-GTR-346.

<sup>7</sup> Biological Opinion on Land and Resource Management Plans for the: Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. March 1, 1995.

<sup>8</sup> A Federal Agency Guide for Pilot Watershed Analysis (Version 1.2), 1994.

<sup>9</sup> Biological Opinion on Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). National Marine Fisheries Service, Northwest Region, January 23, 1995.



**USFWS Table 2. Checklist for Documenting Environmental Baseline and Effect of Proposed Action(s) on Relevant Indicators.**

Diagnostics/ Pathways	Environmental Baseline			Effects of the Action(s)			
Indicators	Functioning Properly	Functioning at Risk	Functioning at Unacceptable Risk	Restore <sup>1</sup>	Maintain <sup>2</sup>	Degrade <sup>3</sup>	Compliance with ACS
<b>Subpopulation Characteristics</b>							
Growth and Survival							
Life History Diversity and Isolation							
Persistence and Genetic Integrity							
<b>Water Quality</b>							
Temperature							
Sediment							
Chemical Contam./Nutrients							
<b>Habitat Access</b>							
Physical Barriers							
<b>Habitat Elements</b>							
Substrate							
Embeddedness							
Large Wood Debris							
Pool Frequency and Quality							
Pool Quality							
Off-Channel Habitat							
Refugia <sup>4</sup>							
<b>Channel Cond. &amp; Dynamics</b>							
Wetted Width/Max. Depth Ratio							
Stream Bank Cond.							
Floodplain Connectivity							
<b>Flow Hydrology</b>							
Change in Peak/Base Flows							
Drainage Network Increase							
<b>Watershed Conditions</b>							
Road Density & Location							
Disturbance History							
Riparian Conservation Areas							
Disturbance Regime							
<b>Watershed Name:</b>	<b>Location:</b>						

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## USFWS Table 2. Checklist for Documenting Environmental Baseline and Effect of Proposed Action(s) on Relevant Indicators. (continued)

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- <sup>1</sup> For the purposes of this checklist, “restore” means to change the function of a “functioning at risk” indicator to “functioning appropriately”, or to change the function of a “functioning at unacceptable risk” indicator to “functioning at risk” or “functioning appropriately” (i.e., it does not apply to “functioning appropriately” indicators). Restoration from a worse to a better condition does not negate the need to consult/confer if take will occur.
- <sup>2</sup> For the purposes of this checklist, “maintain” means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).
- <sup>3</sup> For the purposes of this checklist, “degrade” means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a “functioning at unacceptable risk” indicator may be further worsened, and this should be noted.
- <sup>4</sup> Refugia = watersheds or large areas with minimal human disturbance having relatively high quality water and fish habitat, or having the potential of providing high quality water and fish habitat with the implementation of restoration efforts. These high quality water and fish habitats are well distributed and connected within the watershed or large area to provide for both biodiversity and stable populations.

Adapted from discussions on “Stronghold Watersheds and Unroaded Areas” in Lee, D.C., J.R. Sedell, B.E. Rieman, R.F. Thurow, J.E. Williams and others. 1997. Chapter 4: Broad-scale Assessment of Aquatic Species and Habitats. In T.M. Quigley and S. J. Arbelbide eds “An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins Volume III”. U.S. Department of Agriculture, Forest Service, and U.S. Department of Interior, Bureau of Land Management, Gen Tech Rep PNW-GTR-405.

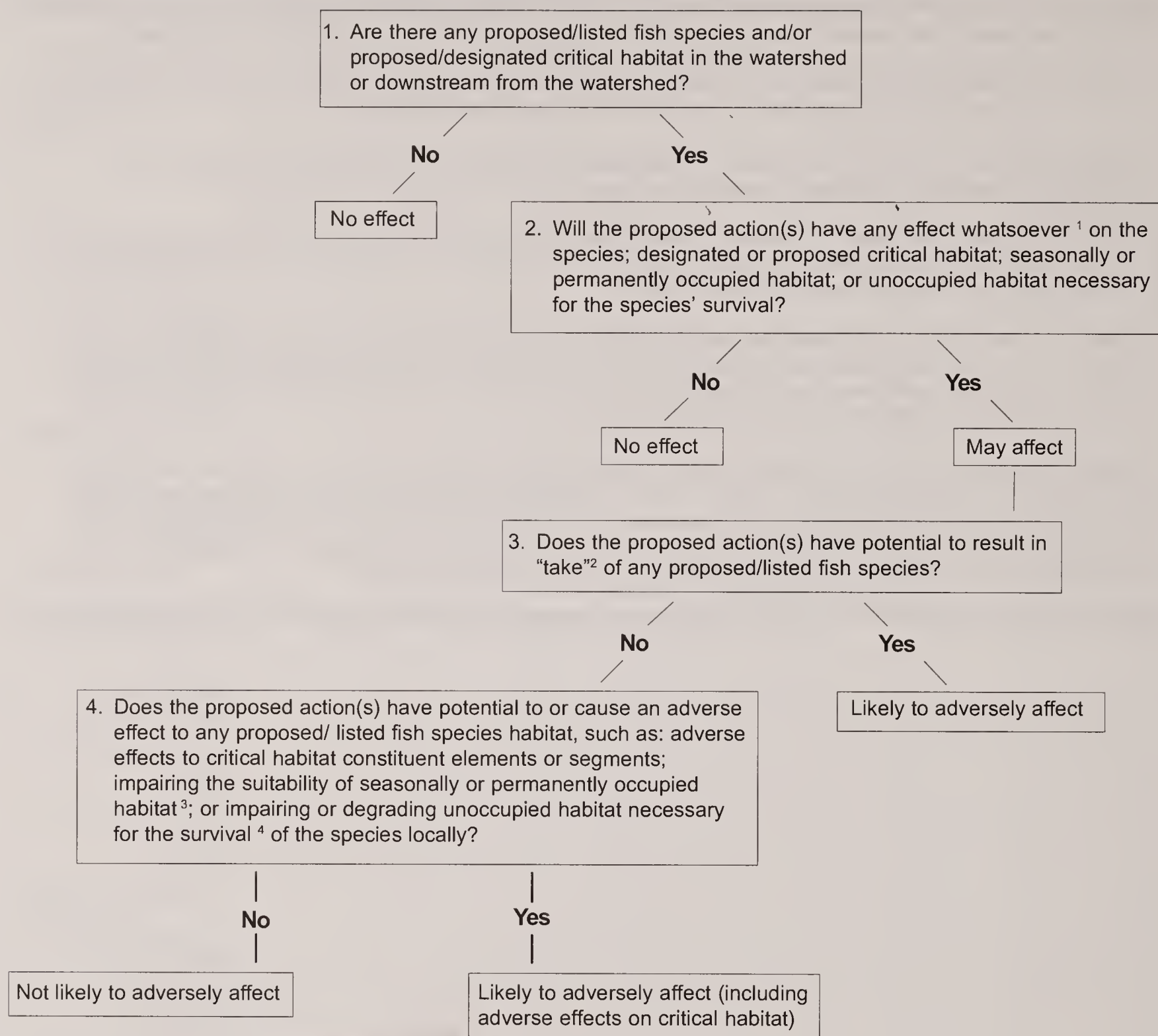
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### USFWS Table 3. Dichotomous Key for Making ESA Determination of Effects.

Circle the conclusion at which you arrive:



<sup>1</sup> **"Any effect whatsoever"** includes small effects, effects that are unlikely to occur, and beneficial effects (all of which are recognized as "may effect" determinations). A **"no effect"** determination is only appropriate if the proposed action **will literally have no effect whatsoever** on the species and/or critical habitat, **not** a small effect, an effect that is unlikely to occur, or a beneficial effect.

<sup>2</sup> **"Take"** - The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS (USFWS, 1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

<sup>3</sup> Action(s) with potential to hinder attainment of relevant **"functioning appropriately indicators"** (from USFWS Table 2) may result in an adverse effect determination due to negative effects on habitat. This may indicate harm or harassment take of the species or adverse effects to habitat necessary for survival of the species locally (i.e. potential for adverse effect w/o take, or adversely affecting critical habitat).

<sup>4</sup> **Survival** - The species persistence, as listed or as a recovery unit, beyond the conditions leading to its endangerment, with sufficient resilience to allow recovery from endangerment. This condition is characterized by a species with a sufficiently large population, represented by all necessary age classes, genetic heterogeneity, and number of sexually mature individuals producing viable offspring, which exists in an environment providing all requirements for completion of the species' entire life cycle, including reproduction, sustenance, and shelter (USDI and USDC 1998).

# Documentation of Expected Incidental Take

Name and location of action(s): \_\_\_\_\_ Species: \_\_\_\_\_

1. The proposed action may result in incidental take through which of the following mechanisms (circle as appropriate)?

**Harm:** Significant impairment of behavioral patterns such as breeding, feeding, sheltering, and others (identify).

**Harass:** Significant disruption of normal behavior patterns which include, but are not limited to, breeding, feeding, sheltering, or others (identify).

**Pursue, Hunt, Shoot, Wound, Capture, Trap, Collect.**

2. What is the approximate duration of the effects of the proposed action(s) resulting in incidental take?

3. Which of the following life stages will be subject to incidental take (circle as appropriate)?

Fertilization to emergence (incubation)

Juvenile rearing to adulthood

Adult holding and overwintering

Adults spawning

**Adults migrating**

4. Which life form and subpopulation status are present in the watershed or downstream of the watershed where the activities will take place (circle as appropriate)?

Life Form:

**Resident**

Adfluvial

Fluvial

**Anadromous**

Subpopulation status:

**Stronghold population**

Depressed population

5. What is the location of the expected incidental take due to the proposed action(s)?

**Basin and watershed:**

Stream reach and habitat units:

6. Quantify your expected incidental take:

**Length stream affected (miles):**

**Individuals (if known):**



# USFWS Appendix A

## Examples of Influences of Human Activities on Aquatic Ecosystems

The following, except the section on water temperature, are excerpts generally from two sources: 1. "An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins, Volume III, Chapter 4, 1997, (referred to as Lee and others 1997), and 2) Rieman and McIntyre 1993. These descriptions are generated to stimulate biologist's thought and Level 1 team discussion on evaluation of all the diagnostics/pathways through which habitat degradation could occur and aquatic populations can be altered. *These examples are not all inclusive.* We recommend that biologists review all the recommended reports and papers suggested on page 8 and use them to gain a more complete insight into each indicator listed in the matrix. The Interior Columbia Basin Assessment can be acquired from the U.S. Forest Service, Pacific Northwest Research Station, 3200 SW Jefferson Way, Corvallis, OR 97331.

### Channel Stability

*(Excerpts from Rieman and McIntyre 1993)*

"Young bull trout are closely associated with stream channel substrates. Incubation occurs over a prolonged period through the winter. Juvenile fish are found in close association with the bottom of the channel, often using substrate for cover (Fraley and Shepard 1989; Oliver 1979; Pratt 1984; Shepard and others 1984b). The association with substrate appears more important for bull trout than for other species (Nakano and others 1992; Pratt 1984).

The extended tie to substrate and the presence of embryos and alevins in substrate during winter and spring suggests that highly variable stream flows, bed load movements, and channel instability will influence the survival of young bull trout (Goetz 1989; Weaver 1985). The embryos and young of fish that

spawn in the fall are particularly vulnerable to flooding and scouring during winter and early spring (Elwood and Waters 1969; Seegrist and Gard 1972; Wickett 1958) and to low winter flows or freezing within the substrate." "Low habitat complexity, the frequency of bed load scour and the frequency of low flows may be aggravated by watershed disruption and problems of channel instability in many bull trout streams."

### Channel Substrate

*(Excerpts from Rieman and McIntyre 1993)*

"Increased sediments reduce pool depth, alter substrate composition, reduce interstitial space, and cause channels to braid (Beschta and Platts 1986; Clifton 1989; Everest and others 1987; Lisle 1982; Megahan and others 1980). Initial work on the influence of fine sediments (Shepard and others 1984a; Weaver and White 1985) suggested that incubating bull trout embryos tolerated fine sediments (less than 6.35 millimeters) better than cutthroat trout, steelhead trout, and brook trout. Their tolerance appeared similar to that of chinook salmon (Hausle and Coble 1976; Irving and Bjornn 1984; Tappel and Bjornn 1983). More recent work (Weaver and Fraley 1991), however, indicated that any increase in fine sediments reduces survival. Others have found that when the percent of fine sediments in the substrate was higher, rearing bull trout were also less abundant (Leathe and Enk 1985; McPhail and Murray 1979; Shepard and others 1984a; Weaver and Fraley 1991)." "Spawners may also "select" sites where substrate is not highly compacted (Graham and others 1981; McPhail and Murray 1979).

It is difficult to predict how much a particular change in substrate composition will affect survival for any salmonid (Chapman 1988; Everest and others 1987; Weaver and Fraley 1991). Some substrates are more likely to accumulate fines than others, and some populations probably are more sensitive than others. In the absence of detailed local information on population habitat dynamics, any increase in the proportion of fines in substrates should be considered a risk to productivity of an environment and to the persistence of associated bull trout populations."



## Cover

*(Excerpts from Rieman and McIntyre 1993)*

“Bull trout usually associate with complex forms of cover and with pools. Juveniles live close to in-channel wood, substrate, or undercut banks (Goetz 1991; Pratt 1984, 1992). Young-of-the-year bull trout use side channels, stream margins, and other areas of low velocity. Older fish use pools (Hoelscher and Bjornn 1989; Pratt 1984) and areas with large or complex woody debris and undercut banks (Graham and others 1981; Oliver 1979; Pratt 1985; Shepard and others 1984b). Woody debris correlated significantly with densities of bull trout sampled in streams in the Bitterroot National Forest (Clancy 1992).” “Cover is important in winter and is thought to limit many fish populations (Chapman 1966; Cunjak and Power 1986). Cover clearly influences population density and overwinter survival of brook trout (Boussu 1954; Hunt 1976; Saunders and Smith 1962).”

## Water Temperature

Researchers recognize temperature more consistently than any other factor influencing bull trout distribution, based mostly on correlative evidence (Reiman and McIntyre 1993). Water temperatures in excess of about 15°C are thought to limit bull trout distribution (Rieman and McIntyre 1993). McPhail and Murray (1979) reported that the survival of bull trout eggs to hatching varied with water temperature: 0-20% survival in 8-10°C, 60-90% in 6°C, and 80-95% in 2-4°C. Temperatures between 4-6°C were needed for egg development in Montana streams (Weaver and White 1985). Water temperature also appears to be a critical factor in the spawning and early life history of bull trout. Spawning has been observed to occur in British Columbia, Oregon, and Montana at or below 9°C (Fraley and Shepard 1989, McPhail and Murray 1979, Riehle 1993).

## Water Quality

*(Excerpts from Rieman and McIntyre 1993)*

“The extent and intensity of land development and land-use activities have increased during the past century.” “Aquatic ecosystem perturbations related to these activities include: 1) thermal pollution; 2) toxicity due to the presence of organic compounds (synthetic and natural) and heavy metal ions; 3) introduction of pathogenic organisms; 4) organic wastes that result in potentially catastrophic changes in dissolved oxygen levels; 5) acidification; 6) elevated

sedimentation rates; and 7) increased eutrophication (Ellis 1989).

Eutrophication is indicative of deteriorating water quality associated with a buildup of nutrients, especially nitrogen and phosphorus. Increased rates of nutrient loading can be related to changes and/or disturbances within a watershed (Brugam and Vallarino 1989; Dojlido and Best 1993; Stauffer 1991). Development activities that contribute to increased nutrient levels include point sources such as industrial effluents and water-borne sewage systems and nonpoint sources such as agricultural operations, residential development and septic systems, road construction, and forest practices (Dojlido and Best 1993; Spencer 1991; Thralls 1991).

Nonpoint source pollution may be the most problematic cause of water quality deterioration because the origin of perturbation is often difficult to identify and control.” “Development can result in increases of nitrogen and phosphorus in surface waters resulting from: septic system effluents (Scott 1991; Sorrie 1994; Stauffer 1991), runoff from fertilized lawns and agricultural lands (Lewis and others 1984; Power and Schepers 1989), and runoff from highways and roads (Ehrenfeld and Schneider 1991; Lewis and others 1984).”

## Some Major Activities and their Effects

*(All of the following are excerpts from Lee and others 1997)*

### Water diversions and dams

“Trends in the number of dams constructed over time and impounded water volumes indicate that many streams and rivers have experienced a rapid and massive change in their hydrology. Even though the rate of increase in storage volume has leveled since the mid-1970s, the total number of dams continues to increase, suggesting that new construction is focused on smaller dams (National Research Council 1995).”

“Reservoir operation has resulted in long-term changes in downstream water temperatures and the annual discharge of water and sediments. The pattern and timing of the annual hydrograph have been altered in most basins on scales ranging from hours to months and even years. In many instances dams have changed large river systems to isolated fluvial fragments between lakes. In arid areas of the



Basin, stream diversions have reduced flows to a trickle."

"Water withdrawals for off-stream uses include rural domestic use, stock watering, irrigation, public water supply, commercial and industrial supply, and thermoelectric cooling." "Agricultural irrigation is by far the dominant off-stream use in the Basin."

"Most irrigation diversions on Forest Service and BLM-administered lands are operated by private individuals, but a few water rights are held by federal agencies."

"Irrigation has contributed to the extirpation of salmon and steelhead from many small streams in the Salmon National Forest (Keifenhien 1992). Many streams in the Sawtooth National Recreation Area have inadequate instream flow as a result of irrigation." "The cumulative loss of spawning and rearing habitat in these tributaries is significant."

### **Grazing and Farming**

"The proportion of land in the Pacific Northwest dedicated to agriculture is relatively small (approximately 16%). However, agricultural practices can have considerable effects on aquatic resources because the lands are often located on historic flood plains and valley bottoms. The effects of farming on aquatic systems include loss of native vegetation, bank instability, loss of floodplain function, removal of large woody debris sources, changes in sediment supply, changes in hydrology, increases in water temperature, changes in nutrient supply, chemical pollution, channel modification, and habitat simplification (Spence and others 1995)."

"The effects of livestock grazing on aquatic systems are related, in part, to the biophysical attributes of the site (Archer and Smeins 1991)." "Unstable stream conditions often exist as part of the natural conditions of streams; however, grazing can amplify these unstable conditions. In some cases, livestock use may initiate additional instability within a stream system."

Overgrazing by livestock can lead to a reduction of soil structure, soil compaction, and damage or loss of vegetative cover. All of these processes contribute to an increase in the rate and erosive force of surface runoff (Meehan and Platts 1978; Thurow 1991). Resulting increases in soil erosion lead to a loss of stored nutrients in the soil and a decrease in the level of vegetative productivity (Thurow 1991). The degree of soil erosion associated with livestock grazing is related to slope gradient and aspect of the site being

grazed, the condition of the soil, type and density of vegetation, and the accessibility of the site to livestock (Meehan and Platts 1978).

Riparian areas maintain stream structure and function through processes such as water filtration, bank stabilization, water storage, groundwater recharge, nutrient retention, regulation of light and temperature, channel shape and pattern (morphology and micro-topography), and dispersal of plants and animals (Cummins and others 1984; Gregory and others 1991; Minshall 1967, 1994; Sullivan and others 1987)." "Livestock grazing can alter the species composition of stream-side vegetation (Archer and Smeins 1991; Platts 1978; Stebbins 1981; Thurow 1991; Vollmer and Kozel 1993) and diminish vegetative productivity (Archer and Smeins 1991; Horning 1994; Meehan and Platts 1978; Platts 1978; Thurow 1991; Vollmer and Kozel 1993). Grazing alters riparian vegetation by removing deep rooting plant species and decreasing canopy cover and riparian vegetation height (Platts 1991). Grazing has been implicated in the alteration of species composition of vegetative communities and associated fire regimes (Agee 1993; Leopold 1924).

Grazing is a major nonpoint source of channel sedimentation (Dunne and Leopold 1978; MacDonald and others 1991; Meehan 1991; Platts 1991). Grazed watersheds typically have higher stream sediment levels than ungrazed watersheds (Lusby 1970; Platts 1991; Rich and others 1992; Scully and Petrosky 1991). Increased sedimentation is the result of grazing effects on soils (compaction), vegetation (elimination), hydrology (channel incision, overland flow), and bank erosion (sloughing) (Kauffman and others 1983; MacDonald and others 1991; Parsons 1965; Platts 1981a, 1981b; Rhodes and others 1994). Sediment loads that exceed natural background levels can fill pools, silt spawning gravels, decrease channel stability, modify channel morphology, and reduce survival of emerging salmon fry (Burton and others 1993; Everest and others 1987; MacDonald and others 1991; Meehan 1991; Rhodes and others 1994). In addition, runoff contaminated by livestock wastes can cause an increase in potentially harmful bacteria (for example, *Pseudomonas aeruginosa* and *Aeromonas hydrophila*) (Taylor and others 1989; Hall and Amy 1990; Thurow 1991). Compared to ungrazed sites, aquatic insect communities in stream reaches associated with grazing activities often are composed of organisms more tolerant of increased silt levels, increased levels of total alkalinity and mean conductivity, and elevated water temperatures (Rinne 1988)."



## Timber Harvest

"Anderson (1988), citing a 1986 report of the Montana State Water Quality Bureau, suggested that the single greatest threat to watersheds and aquatic life is timber harvest and associated road building within forests. This threat is due, in part, to the increased level of harvesting timber from steeper, more environmentally sensitive terrain (Anderson 1998; Platts and Megahan 1975). Accelerated surface erosion and increased levels of sedimentation can decrease after initial disturbance but may remain above natural levels for many years (Platts and Megahan 1975; Spencer 1991; Swanson 1981)." "Vulnerable watersheds generally have high slope gradients, high levels of potential soil erodibility, soils having moderate to very poor drainage, or soil moisture contents in excess of field capacity for long periods of the year (van Kesteren 1986).

Soil and site disturbance that inevitably occur during timber harvest activities are often responsible for increased rates of erosion and sedimentation (Chamberlain and others 1991; FEMAT 1993; MacDonald and others 1991; Meehan 1991; Reid 1993; Rhodes and others 1994); modification and destruction of terrestrial and aquatic habitats (FEMAT 1993; van Kesteren 1986); changes in water quality and quantity (Bjornn and Reiser 1991; Brooks and others 1992; Chamberlain and others 1991; Rhodes and others 1994); and perturbation of nutrient cycles within aquatic ecosystems (Rowe and others 1992). Physical changes affect runoff events, bank stability, sediment supply, large woody debris retention, and energy relationships involving temperature (Li and Gregory 1995). All of these changes can eventually culminate in the loss of biodiversity within a watershed (FEMAT 1993; Rowe and others 1992).

Increased delivery of sediments, especially fine sediments, is usually associated with timber harvesting and road construction (Eaglin and Hubert 1993; Frissell and Liss 1986; Havis and others 1993; Platts and Megahan 1975). As the deposition of fine sediments in salmonid spawning habitat increase, mortality of embryos, alevins, and fry rises. Erosion potential is greatly increased by reduction in vegetation, compaction of soils and desruption of natural surface and subsurface drainage patterns (Chamberlain and others 1991; Rhodes and others 1994). Generally, logged slopes contribute sediment to streams based on the amount of bare compacted soils that are exposed to rainfall and runoff. Slope steepness and proximity to channels determine the rate of sediment delivery.

Water quality (for example, water temperature, dissolved oxygen, and nutrients) can be altered by

timber harvest activities (Chamberlain and others 1991). Stream temperature is affected by eliminating stream-side shading, disrupted subsurface flows, reduced stream flows, elevated sediments, and morphological shifts toward wider and shallower channels with fewer deep pools (Beschta and others 1987; Chamberlain and others 1991; Reid 1993; Rhodes and others 1994). Dissolved oxygen can be reduced by low stream flows, elevated temperatures, increased fine inorganic and organic materials that have infiltrated into stream gravels retarding intergravel flows (Bustard 1986; Chamberlain and others 1991). Nutrient concentrations may increase following logging but generally return quickly to normal levels (Chamberlain and others 1991).

Because the supply of large woody debris to stream channels is typically a function of the size and number of trees in riparian areas, it can be profoundly altered by timber harvest (Bisson and others 1987; Sedell and others 1988; Robison and Beschta 1990). Shifts in the composition and size of trees within the riparian area affect the recruitment potential and longevity of large woody debris within the stream channel. Large woody debris influences channel morphology, especially in forming pools and instream cover, retention of nutrients, and storage and buffering of sediment. Any reduction in the amount of large woody debris within streams, or within the distance equal to one site-potential tree height from the stream, can reduce instream complexity (Rainville and others 1985; Robison and Beschta 1990). Large woody debris increases the quality of pools, provides hiding cover, slow water refuges, shade, and deep water areas (Rhodes and others 1994). Ralph and others (1994) found instream wood to be significantly smaller and pool depths significantly shallower in intensively logged watersheds. The size of woody debris in a logged watershed in Idaho was smaller than that found in a relatively undisturbed watershed (Overton and others 1993).

Because water is often delivered to lakes via stream channels, we can infer that effects to streams related to timber harvest and road construction may eventually be manifested within lakes." "Birch and others (1980) reported that timber harvest activities caused increases in lake sedimentation rate and lake productivity in three of four lakes studied in western Washington, accelerating the rate of change in the trophic status of each lake. Timber harvest activities and road construction, including railroad construction, increased sedimentation rates above natural levels in three lakes of the Flathead Basin (Spencer 1991). Road construction appeared to be the greatest cause of disturbance resulting in enhanced fine sediment deposition in lakes downstream from the construction areas."



## Roads

"Roads contribute more sediment to streams than any other land management activity (Gibbons and Salo 1973; Meehan 1991), but most of the land management activities, such as mining, timber harvest, grazing, recreation, and water diversions are dependent on roads. The majority of sediment from timber harvest activities are related to roads and road construction (Chamberlain and others 1991; Dunne and Leopold 1978; Furniss and others 1991; Megahan and others 1978; MacDonald and Ritland 1989) and associated increased erosion rates (Beschta 1978; Gardner 1979; Meehan 1991; Reid 1993; Reid and Dunne 1984; Rhodes and others 1994; Swanson and Dyrness 1975; Swanson and Swanson 1976)." "Roads can also affect water quality through applied road chemicals and toxic spills (Furniss and others 1991; Rhodes and others 1994)."

"Roads directly affect natural sediment and hydrologic regimes by altering streamflow, sediment loading, sediment transport and deposition, channel morphology, channel stability, substrate composition, stream temperatures, water quality, riparian conditions within a watershed. For example, interruption of hill-slope drainage patterns alters the timing and magnitude of peak flows and changes base stream discharge (Furniss and others 1991; Harr and others 1975) and sub-surface flows (Furniss and others 1991; Megahan 1972). Road-related mass soil movements can continue for decades after the roads have been constructed (Furniss and others 1991). Such habitat alterations can adversely affect all life-stages of fishes, including migration, spawning, incubation, emergence, and rearing (Furniss and others 1991; Henjum and others 1994; MacDonald and others 1991; Rhodes and others 1994)."

"Road/stream crossings can also be a major source of sediment to streams resulting from channel fill around culverts and subsequent road crossing failures (Furniss and others 1991). Plugged culverts and fill slope failures are frequent and often lead to catastrophic increases in stream channel sediment, especially on old abandoned or unmaintained roads (Weaver and others 1987). Unnatural channel widths, slope, and stream bed form occur upstream and downstream of stream crossings (Heede 1980), and these alterations in channel morphology may persist for long periods of time. Channelized stream sections resulting from riprapping of roads adjacent to stream channels are directly affected by sediment from side casting, snow removal, and road grading; such activities can trigger fill slope erosion and failures. Because improper culverts can reduce or eliminate fish passage (Belfore and Gould 1989), road crossings are a common migration barrier to fishes (Evans and

Johnston 1980; Furniss and others 1991; Clancy and Reichmuth 1990)."

## Mining

"Although any mining activity may have negative effects on aquatic ecosystems (according to the Pacific States Marine Fisheries Commission 1994, 14,400 kilometers of rivers and streams in the western United States have been polluted by mining), the largest impacts are generally associated with surface mining."

"Mining activities can affect aquatic systems in a number of ways: through the addition of large quantities of sediments, the addition of solutions contaminated with metals or acids, the acceleration of erosion, increased bank and streambed instability, and changes in channel formation and stability. Sediments enter streams through erosion of mine tailings (Besser and Rabeni 1987), by direct discharge of mining wastes to aquatic systems, and through movement of groundwater (Davies-Colley and others 1992). Coarse particles that enter watersheds are likely to settle relatively rapidly (Davies-Colley and others 1992), and therefore, effects on aquatic systems are greatest near mining activities. Fine inorganic particles (like clays) settle slowly and may travel great distances from the point of their introduction and therefore may have a greater effect on water bodies such as lakes further from mining activities. Fine suspended material reduces the amount of light available for benthic algae and plants, and thereby, biomass and primary production are diminished. Fine suspended materials may also reduce the quantity and quality of epilithon (substrate surface biofilm) that serves as food for benthic invertebrates. If suspended sediments damage respiratory structures of benthic invertebrates, their abundance may decline (Davies-Colley and others 1992)."

"Acidification of surface waters, a process associated with surface mining, mobilizes toxic metals naturally embedded in soils and streambeds." "Acidification of surface waters can affect organisms directly, such as salmonids which experience reduced egg viability, fry survival, growth rate, and other ills, or indirectly from toxic metals or substances which can affect growth, reproduction, behavior, and migration of salmonids and production of benthic algae (Spence and others 1995). Ecosystem responses to contaminants are dependant on the chemical, physical, biological, and geological processes at each site (Pascoe and others 1993). Depending on concentration, trace metal toxicity may reduce growth and reproduction or cause death of aquatic organisms (Leland and Kuwabara 1985). Adult stages of mollusks and fish



can generally withstand higher concentrations of metals than other organisms (Leland and Kuwabara 1985), but embryonic and larval stages are quite sensitive to heavy metals (Leland and Kuwabara 1985). The combination of some metals may inhibit primary production more than any single metal alone (Wong and others 1978); therefore, when several metals are present, water quality criteria for single metals are insufficient for protecting aquatic life (Borgmann 1980)."

"Surface mining practices of dredging and placer mining have altered aquatic habitats by destroying riparian vegetation and reworking channels."

Common practice for extracting gold today involves heap leach mining, a form of open-pit mining used for low-grade ore deposits. Piles of crushed ore are sprayed with a solution of sodium-cyanide (NaCN) that bonds with gold particles and is deposited in pools from which the gold is recovered. Numerous, small heap leach fields are located in the Basin, primarily in floodplains of rivers or streams which are susceptible to large floods, creating the potential for flood inundation of the toxic leach pools and consequent contamination of river or stream habitats."

## **Non-native Fish Species**

"Most introductions have been made with the intent of creating or expanding fishing opportunities and were initiated in earnest as early as the late 1800's (Evermann 1893; Simpson and Wallace 1978). Stocking of mountain lakes with cultured stocks of cut-throat, brook, and rainbow trout has been extensive (Bahls 1992; Liss and others 1995; Reiman and Apperson 1989)." "A variety of species such as kokanee salmon, chinook salmon, lake trout, brown trout, Atlantic salmon, coho salmon, black bass and other centrarchids, and ictalurids were introduced in these systems to diversify angling opportunities, create trophy fisheries, and to provide forage for potential trophy species."

"Although introductions have provided increased fishing opportunities and socioeconomic benefits, they have also led to catastrophic failures in some fisheries and expanded costs to management of declining stocks (Bowles and others 1991; Gresswell 1991; Gresswell and Varley 1988; Wydoski and Bennett 1981)."

"Non-native fishes also threaten native species through hybridization and subsequent loss of the native genome through introgression." "Hybridization between brook trout and bull trout appears to be common where the species overlap (Adams 1994;

Leary and others 1993; Reiman and McIntyre 1993), and elimination or displacement of bull trout can be a common outcome (Leary and others 1993).

Predation by non-native species may have an important influence on some native cyprinids and catostomids (Williams and others 1990), resident trout populations (Griffith 1988; Reiman and Apperson 1989), and on the survival of juvenile anadromous salmonids (Reiman and others 1991)." "Predation by introduced fishes is also commonly identified as a major factor in the isolation and decline of native amphibians (Bahls 1992; Bradford and others 1993; Liss and others 1995) and has important effects on local invertebrate faunas as well (Bahls 1992; Liss and others 1995)."

"Consequences of introducing non-native species are not limited to a few interacting species. Effects frequently cascade through entire ecosystems (Winter and Hughes 1995) and compromise structure and ecological function in ways that rarely can be anticipated (Li and Moyle 1981; Magnuson 1976; Moyle and others 1986)."

"There is growing recognition that biological integrity and not just species diversity (Angermeier 1994; Angermeier and Karr 1994) is an important characteristic of aquatic ecosystem health. The loss or restriction of native species and the dramatic expansion of non-native species leave few systems that are not compromised."

## **Hatcheries**

"Although the cultured stocks of salmonids have been frequently used to mitigate the effects of over-harvest and habitat degradation, there is substantial evidence that this practice has detrimental effects on native populations (Hindar and others 1991; Krueger and May 1991; Marnell 1986; Miller 1954). Offspring of hatchery fish spawning in the wild do not survive as well as the offspring of wild fish (Chilcote and others 1986; Leider and others 1990; Nickelson and others 1986), even if the hatchery stock was developed from wild adults (Reisenbichler and McIntyre 1977). There is unavoidable selection for traits favoring survival in the artificial conditions of egg trays, tanks, raceways, and holding ponds. Hatchery fish thus become genetically distinct from wild fish. If they stray and subsequently spawn with wild fish in natural areas, survival of the offspring is compromised (Chilcote and others 1986).

Despite lower survival, hatchery fish occupy habitat that would otherwise be used by wild fish (Miller 1954). In addition, artificially high densities of fish



returning to hatcheries attract intensive fisheries that can over-harvest wild fish (Reisenbichler, in press; Wright 1981, 1993)."

"Many hatcheries located on tributaries of the Columbia River have water intakes upstream of structures designed to divert migrating fish into hatchery ponds. In order to reduce the risk of transmitting diseases to the hatchery via its water intake, adult fish are not passed upstream of the intake barrier at many sites. Protection of hatchery water supplies often prevents natural populations from accessing large tracts of historic spawning and nursery area."

### **Commercial and Recreational Harvest**

"Angler harvest directly increases mortality and thereby influences total population abundance, size- and age-structure, and reproductive potential (Ricker 1975). Fishing may lead to substantial declines in abundance, especially in populations that are extremely vulnerable to certain types of gear." "Although high catchability may be desirable in sport fisheries, it may lead to substantial declines in abundance and changes in population structure without restrictions (Gresswell 1990; Gresswell and others 1994; Gresswell and Liss 1995).

Although management agencies have attempted to reduce or eliminate fishing as a source of mortality, incidental harvest of many sensitive native fish stocks is a problem in the Basin." "Anglers may also affect fish stocks by altering fish habitat through redd trampling and increased bank erosion. Roberts and White (1992) demonstrated that wading on trout redds can cause mortality to eggs and fry. For many years, stream reaches in some states have been closed to angling during salmon spawning season to reduce harassment of spawning fish."

"Within the past decade, many agencies have adopted new philosophies of management that prioritize restoration and management of native fish stocks and their habitats (Idaho Department of Fish and Game (IDFG) 1991) and recognize the non-consumptive values of fish (Botsford 1994; Gresswell 1994). Where habitat for native species remains suitable, fish populations have increased substantially following implementation of restrictive harvest regulations (Gresswell 1990; Varley and Gresswell 1988)." "Bull trout numbers and redds also increased in response to decreased harvest (Ratliff 1992). These examples suggest that where populations retain resilience, restoration efforts can be successful."

### **Habitat Fragmentation and Simplification**

"Aquatic habitat fragmentation (impassable obstructions, temperature increases, and water diversion) and simplification (channelization, removal of woody debris, channel bed sedimentation, removal of riparian vegetation, and water flow regulation) have resulted in a loss of diversity within and among native fish populations."

"Theories from population and conservation biology predict that smaller or more isolated populations have an increased risk of extirpation, and that smaller patches of habitat are likely to support less diverse communities (Boyce 1992; Gilpin and Soule 1986; MacArthur and Wilson 1967; Simberloff 1988). There is empirical evidence that these are important issues for many aquatic communities and species (Gilpin and Diamond 1981; Hanks 1991; Sjogren 1991) including fishes (Reiman and McIntyre 1995; Schlosser 1991; Sheldon 1988). At the same time species and communities that are spatially diverse face lower risks of regional extirpation in highly variable environments (den Boer 1968; Simberloff 1988). Core or source populations that are resistant to disturbance may support populations in other marginal or ephemeral habitats through dispersal (Bowers 1992; Simberloff 1988). The quality and distribution of even a few such key areas may ultimately dominate the dynamics of whole systems (Bowers 1992).

The heterogeneity of habitats for aquatic organisms, and particularly fishes, has been clearly recognized at multiple scales from microhabitat units to entire basins (Sedell and others 1990; Schlosser 1991). This spatial complexity is seen as an important factor influencing species diversity and ecosystem stability (Bowers 1992; Gresswell and others 1994; Schlosser 1991) and results in discontinuous distribution of life stages, populations, metapopulations, or subspecies and species as well. Important habitat types, such as pools or off-channel rearing areas, are discontinuous within stream reaches and influence the distributions and relative abundances of a species or life stages at that scale (Schlosser 1991). At larger watershed scales the distribution among reaches and among streams may be influenced by such things as local climate, stream temperature, stream gradients, the distribution of suitable spawning sites and gravels, and stream size (Fausch and others 1994; McIntyre and Rieman 1995; Rieman and McIntyre 1995). Spawning and rearing of bull trout and westslope and Yellowstone cutthroat trout, for example, may be restricted to smaller, headwater streams both by temperature and stream size even though subadults and adults may move widely throughout entire river basins



(Gresswell 1995; McIntyre and Reiman 1995; Reiman and McIntyre 1995)."

"Fringe environments that do not support a large abundance of fishes may actually contribute much of the genetic variability to the population and may contribute in a critical way to the persistence of much larger systems (Northcote 1992; Scudder 1989). The connection among spatially diverse and temporally dynamic habitats and populations is likely to be a critical factor to persistence and integrity of aquatic communities.

Fishes, particularly salmonids, exhibit remarkable diversity of life-history strategies (Lichatowich and Mobrand 1995; Reiman and McIntyre 1993; Thorpe 1994) and important dispersal mechanisms for dealing with naturally fragmented and variable environments (Milner and Bailey 1989; Quinn 1993; Thorpe 1994). Migratory life-history forms may be a particularly important mechanism of dispersal and risk aversion in highly variable environments for species like bull and Yellowstone cutthroat trout (Gresswell and others 1994; Reiman and McIntyre 1993).

The loss or degradation of habitats resulting from anthropogenic activities has not occurred in a random or uniformly dispersed fashion. Often lower elevation lands are more accessible, have wider floodplain valleys, and are more easily developed, hence habitat degradation has been greater in lower watersheds or in the lower reaches of larger systems. Dams and water diversions often result in fragmented streams and rivers. As a result, watershed retaining the best remaining habitats are not well dispersed throughout the individual basins; they are often restricted to less productive headwater areas. Small streams in the headwater basins actually represent more extreme or sensitive environments with limited resilience to disturbance, increased synchrony among the populations, and relatively poor potential for dispersal throughout the entire Basin.

Because life-history stages and forms are also distributed in non-uniform or non-random patterns (Lichatowich and Mobrand 1994; Reiman and Apperson 1989; Schlosser 1991), some have been more likely to disappear than others. Within heavily managed areas, disturbance has often been dispersed among watersheds in an effort to minimize damage in any single area. If most watersheds are compromised, there are few local populations with the resilience to persist in the face of major storm or other catastrophic events that eventually test those populations. When high quality habitats are isolated in a system, the loss of migratory life histories, elimination of connecting corridors, or the poor quality of interspersed habitats that may act as "stepping stones" (Gilpin 1987) for

dispersal may seriously limit the connectivity among populations. Eventually the ability of populations to rebound or support those that are lost is diminished."

"The loss of life history expression influences the connectivity and stability among populations, but it also has restricted the full potential for fish production (Lichatowich and Mobrand 1995). The challenge for aquatic ecosystem management will be the maintenance and restoration of spatially diverse, high quality habitats that minimize the risks of extinction (Frissell and others 1993; Reeves and Sedell 1992) and that provide for the full expression of potential life histories (Healey 1994; Lichatowich and Mobrand 1995)."

## General Recreational Activities

"Mountain lakes, especially those in national parks and scenic forested areas, may be the most susceptible aquatic systems to the negative effects of recreation. The inherent sensitivity of a lake to pollutants influences its susceptibility to water-quality degradation (Gilliom and others 1980)." "Likelihood of pollutant-loading increases if soil, geologic, or hydrologic characteristics of a watershed favor the transport of pollutants to a lake (Gilliom and others 1980)."

"Where visitor use is high, trampling associated with foot traffic can affect vegetation along lakes and streams through direct mechanical action and indirectly through changes in soil (Liddle 1975). Resistance to trampling depends on plant life form; large and broad-leaved plants are most susceptible, and grasses generally are most resistant (Burden and Randerson 1972). Loss of vegetation from shorelines, wetlands, or steep slopes can cause erosion and pollution problems (Burden and Randerson 1972; Gilliom and others 1980)."

"Power boats can have numerous negative effects on lake environments. Resuspension of bed sediments can occur with passage of a single boat (Garrad and Hey 1987)." "Concomitant high levels of turbidity and reduced light penetration may be a major factor in declining populations of submerged macrophytes." "Power boats are also associated with the spread of the exotic Eurasian watermilfoil (*Myriophyllum spicatum*). Because it reproduces from seeds, rhizomes, and fragmented stems, this non-native plant is easily transported between water bodies when plant matter becomes entangled on boat propellers or trailers (Reed 1977)."

"Outboard engines introduce hydrocarbon emissions to the aquatic environment, and emissions have a high phenol content that is quite toxic to aquatic



organisms (Wachs and others 1992). Increased lead levels in reservoirs may be attributed to recreational boating and gasoline spills (Cairns and Palmer 1993)."

"Effects of off-road recreational vehicle use on aquatic resources are documented only for a few types of natural systems. On sand dunes and shorelines, off-road vehicles can result in significant reductions of vegetation (Anders and Leatherman 1987; Wisheu and Keddy 1991)." "Disturbance associated with off-road vehicle use can alter plant community composition or create openings in cover vegetation on shorelines (Wisheu and Keddy 1991). Partial loss of vegetation from shorelines can result in increased erosion that continues until those shorelines are devoid of vegetation (Wisheu and Keddy 1991). Because seeds tend not to be deeply buried in shoreline wetlands, they may be particularly sensitive to intense disturbance (Wisheu and Keddy 1991), and recovery of disturbed shorelines may be very slow. Use of off-road vehicles may be particularly detrimental in fragile soils or in areas where habitat for sensitive species is limited (Williams 1995). Additionally, off-road vehicle use in streams can result in destruction of redds, eggs, and young."

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# USFWS Appendix B

## Relating the ACS Objectives and Aquatic/Riparian Strategy Objectives with the Diagnostics/ Pathways and Indicator

### ACS Objectives of the Northwest Forest Plan

Forest Service and BLM-administered lands within the range of the northern spotted owl will be managed to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, wetland ecosystems. Water quality must remain within the

range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

5. Maintain and restore the sediment regime under which aquatic ecosystemsevolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic,and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and enter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

### Aquatic/Riparian Strategy Objectives in PACFISH and INFISH

The ACS for PACFISH and INFISH is written as “Riparian Goals” that describe expectations in establishing the characteristics of healthy, functioning watersheds, riparian areas, and associated fish habitats. These are interim directions. Until a long-term direction is finalized, these goals/objectives amend LRMPs and RMP in areas within the proposed bull trout listing areas but outside of that land covered by the Northwest Forest Plan.



Maintain or restore:

1. water quality, to a degree that provides for stable and productive riparian and aquatic ecosystems;
2. stream channel integrity, channel processes, and the sediment regime (including the elements of timing, volume, and character of sediment input and transport) under which the riparian and aquatic ecosystems developed;
3. instream flows to support healthy riparian and aquatic habitats, the stability and effective function of stream channels, and the ability to route flood discharges;
4. natural timing and variability of the water table elevation in meadows and wetlands;
5. diversity and productivity of native and desired non-native plant communities in riparian zones;
6. riparian vegetation, to:
  - a. provide an amount and distribution of large woody debris characteristic of natural aquatic and riparian ecosystems;
  - b. provide adequate summer and winter thermal regulation within the riparian and aquatic zones; and
  - c. help achieve rates of surface erosion, bank erosion, and channel migration characteristics of those under which the communities developed.
7. riparian and aquatic habitats necessary to foster the unique genetic fish stocks that evolved within the specific geo-climatic region; and
8. habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

A comparison between ACS Objectives of the Northwest Forest Plan and the diagnostics/ pathways and indicators used in the effects matrix.

**USFWS Appendix B - Table 1. Relation of Indicators to ACS and Aquatic/Riparian Strategy Objectives.**

<b>Aquatic Conservation Strategy Objectives - Northwest Forest Plan</b>	<b>Aquatic/Riparian Strategy Objectives - PACFISH/INFISH</b>	<b>Indicators</b>
1, 8, 9	7, 8	Subpop Char / Subpop Size
3, 4, 5, 9	1, 2, 7, 8	Subpop Char / Grow & Survl
1, 2, 4, 6, 7, 9	1, 2, 3, 6, 7	Subpop Char / Life History Diversity & Isolation
2, 6, 9	3, 6, 7, 8	Subpop Char / Persistence & Genetic Integrity
2, 4, 8, 9	1, 5, 6, 7	Water Quality / Temperature
4, 5, 6, 8, 9	1, 2, 3, 4, 5, 6, 7	Water Quality / Sediment
2, 4, 8, 9	1, 5, 7, 8	Water Quality / Chemical Concentration/Nutrients
2, 6, 9	3, 7, 8	Hab Access / Phys Barriers
3, 5, 8, 9	2, 6, 7, 8	Hab Elem / Substrate Embed
3, 6, 8, 9	2, 3, 6, 7	Hab Elem / L W D
3, 8, 9	2, 6, 7	Hab Elem / Pool Freq & Qual
3, 5, 6, 9	2, 3, 7	Hab Elem / Large Pools
1, 2, 3, 6, 8, 9	2, 3, 4, 6, 7	Hab Elem / Off-Channel Hab
1, 2, 9	7, 8	Hab Elem / Refugia
3, 8, 9	3, 7, 8	Chan Cond & Dynamics / Wet Width/Max Depth Ratio
3, 8, 9	1, 2, 5, 6, 7	Chan Cond & Dynamics / Streambank Condition
1, 2, 3, 6, 7, 8, 9	3, 4, 5, 6, 7	Chan Cond & Dynamics / Floodplain Connectivity
5, 6, 7	2, 3, 6	Flow/Hydrology / Change in Peak/Base Flow
2, 5, 6, 7	2, 3	Flow/Hydrology / Increase in Drainage Network
1, 3, 5	2, 4, 8	Watershed Conditions / Road Density & Location
1, 5	2, 6, 8	Watershed Conditions / Disturbance History
1, 2, 3, 4, 5, 8, 9	1, 2, 4, 5, 6, 7, 8	Watershed Conditions / RCA, RHCA, Riparian Reserves
1, 2, 4, 5, 6, 7, 8, 9	1, 2, 4, 5, 6, 7, 8	Watershed Condition / Disturbance Regime



# NMFS Matrix

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## **Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale**

**Prepared by the National Marine Fisheries Service  
Environmental and Technical Services Division Habitat  
Conservation Branch, August 1996. This document was  
reformatted for the ICBEMP Supplemental Draft EIS.  
Content was not changed**

### **Overview**

The following guidelines are designed to facilitate and standardize determinations of effect for Endangered Species Act (ESA) conferencing, consultations and permits focusing on anadromous salmonids. We recommend that this process be applied to individual or grouped actions at the watershed scale. When the National Marine Fisheries Service (NMFS) conducts an analysis of a proposed activity it involves the following steps: (1) Define the biological requirements of the listed species; (2) evaluate the relevance of the environmental baseline to the species' current status; (3) determine the effects of the proposed or continuing action on listed species; and (4) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the environmental baseline and any cumulative effects, and considering measures for survival and recovery specific to other life stages. The last item (item 4) addresses considerations given during a jeopardy analysis.

This document provides a consistent, logical line of reasoning to determine when and where adverse effects occur and why they occur. Please recognize that this document does not address jeopardy or identify the level of take or adverse effects which would constitute jeopardy. Jeopardy is determined on a case by case basis involving the specific information on habitat conditions and the health and status of the fish population. NMFS is currently preparing a set of guidelines, to be used in conjunction with this document, to help in the determination of jeopardy.

This document contains definitions of ESA effects and examples of effects determinations, a matrix of pathways of effects and indicators of those effects, a checklist for documenting the environmental baseline and effects of the proposed action(s) on the relevant indicators, and a dichotomous key for making determinations of effect. None of the tools identified in this document are new inventions. The matrix, checklist, and dichotomous key format were developed by the US Fish and Wildlife Service (USFWS) Region 2 and the USDA Forest Service Region 3 for a programmatic ESA section 7 consultation on effects of grazing (USFWS, May 5, 1995). The matrix developed here reflects the information needed to implement the Aquatic Conservation Strategy (ACS) (Appendix D) and to evaluate effects relative to the Northwest Forest Plan ACS Objectives, and the Ecological Goals in the Proposed Recovery Plan for Snake River Salmon (appendix D) and the LRMP consultation on the eight National Forests in Idaho and Oregon.

Using these tools, the Federal agencies and Non-Federal Parties (referred to as evaluators in the remainder of this document) can make determinations of effect for proposed projects (i.e. "no effect"/"may affect" and "may affect, not likely to adversely affect"/"may affect, likely to adversely affect"). As explained below, these determinations of effect will depend on whether a proposed action (or group of actions) hinders the attainment of relevant environmental conditions (identified in the matrix as pathways and indicators) and/or results in "take", as defined in ESA, section 3 (18) of a proposed or listed species.

Finally, this document was designed to be applied to a wide range of environmental conditions. This means it must be flexible. It also means that a certain degree of professional judgement will be required in its application. *There will be circumstances where the ranges of numerics or descriptions in the matrix simply do not apply to a specific watershed or basin. In such a case, the evaluator will need to provide more biologically appropriate values. When this occurs, documentation justifying these changes should be presented in the biological assessment, habitat conservation plan, or other appropriate document so that NMFS can use it in preparation of a section 7 consultation, habitat conservation plan, or other appropriate biologically based document.*

## Description of the Matrix

The "Matrix of Pathways and Indicators" (NMFS Table 1) is designed to summarize important environmental parameters and levels of condition for each. This matrix is divided into six overall pathways (major rows in the matrix):

- ♦ Water Quality
- ♦ Channel Condition and Dynamics
- ♦ Habitat Access
- ♦ Flow/Hydrology
- ♦ Habitat Elements
- ♦ Watershed Conditions

Each of the above represents a significant pathway by which actions can have potential effects on anadromous salmonids and their habitats. The pathways are further broken down into "indicators." Indicators are generally of two types: (1) Metrics that have associated numeric values (e.g. "six pools per mile"); and (2) descriptions (e.g. "adequate habitat refugia do not exist"). The purpose of having both types of indicators in the matrix is that numeric data are not always readily available for making determinations (or there

are no reliable numeric indicators of the factor under consideration). In this case, a description of overall condition may be the only appropriate method available.

The columns in the matrix correspond to levels of condition of the indicator. There are three condition levels: "properly functioning," "at risk," and "not properly functioning." For each indicator, there is either a numeric value or range for a metric that describes the condition, a description of the condition, or both. When a numeric value and a description are combined in the same cell in the matrix, it is because accurate assessment of the indicator requires attention to both.

## Description of the Checklist

The "Checklist for Documenting Environmental Baseline and Effects of Proposed Action(s) on Relevant Indicators" (NMFS Table 2) is designed to be used in conjunction with the matrix. The checklist has six columns. The first three describe the condition of each indicator (which when taken together encompass the environmental baseline), and the second three describe the effects of the proposed action(s) on each indicator.

## Description of the Dichotomous Key for Making ESA Determinations of Effect

The "Dichotomous Key for Making ESA Determinations of Effect" (NMFS Figure 1) is designed to guide determinations of effect for proposed actions that require a section 7 consultation or permit under Section 10 of the ESA. Once the matrix has been tailored (if necessary) to meet the needs of the evaluators, and the checklist has been filled out, the evaluators should use the key to help make their ESA determinations of effect.



# How to Use the Matrix, Checklist, and Dichotomous Key

- 1. Group projects that are within a watershed.
- 2. Using the Matrix provided (or a version modified by the evaluator) **evaluate environmental baseline conditions** (mark on checklist), use all 6 pathways (identified in the matrix).

### Matrix of Pathways and Indicators

Use to describe the Environmental Baseline Conditions  
Water Quality, Habitat Access, Habitat Elements, Channel Condition and Dynamics, Flow/  
Hydrology, Watershed Condition

and

Then use the same Pathways and Indicators to evaluate the Proposed Projects



Mark Results on Checklist

- 3. **Evaluate effects of the proposed action** using the matrix. Do they restore, maintain or degrade existing baseline conditions? Mark on checklist.

### Checklist

<u>Environmental Baseline</u>			<u>Effects of the Action</u>		
Properly	At	Not Properly	Maintain	Restore	Degrade
Funct.	Risk	Funct.			

- 4. Take the checklist you marked and the dichotomous key and answer the questions in the key **to reach a determination of effects.**

Use Professional Judgement  
and the Checklist to



Work through the Dichotomous Key

### Dichotomous Key

Yes/No  
No Effect  
May Effect  
Not Likely to Adversely Affect  
Likely to Adversely Affect

# Definitions of ESA Effects and Examples

## Definitions of Effects Thresholds

Following are definitions of ESA effects (sources in *italics*). The first three (“no effect,” “may affect, not likely to adversely affect,” and “may affect, likely to adversely affect”) are not defined in the ESA or implementing regulations. However, “likely to jeopardize” is defined in the implementing regulations:

### “No effect”

This determination is only appropriate “if the proposed action will literally have no effect whatsoever on the species and/or critical habitat, not a small effect or an effect that is unlikely to occur.” (From *“Common flaws in developing an effects determination”*, Olympia Field Office, U.S. Fish and Wildlife Service). Furthermore, actions that result in a “beneficial effect” do not qualify as a no effect determination.

### “May affect, not likely to adversely affect”

“The appropriate conclusion when effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive effects without any adverse effects to the species or habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgement, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.” (From *“Draft Endangered Species Consultation Handbook; Procedures for Conducting Section 7 Consultations and Conferences,”* USFWS/NMFS, 1994). The term “negligible” has been used in many ESA consultations involving anadromous fish in the Snake River basin. The definition of this term is the same as “insignificant.”

### “May affect, likely to adversely affect”

The appropriate conclusion when there is “more than a negligible potential to have adverse effects on the species or critical habitat” (*NMFS draft internal guidelines*). Unfortunately, there is no definition of adverse effects in the ESA or its implementing regulations. The draft Endangered Species Handbook (NMFS/USFWS, June 1994) provides this definition for “Is likely to adversely affect”: “This conclusion is reached if any adverse effect to listed species or critical habitat may occur as a direct or indirect result of the proposed action or its interrelated or interdependent actions. In the event the overall effect of the proposed action is beneficial to the listed species or critical habitat, but may also cause some adverse effects to individuals of the listed species or segments of the critical habitat, then the proposed action ‘is likely to adversely affect’ the listed species or critical habitat.”

The following is a definition specific to anadromous salmonids developed by NMFS, the FS, and the BLM during the PACFISH consultation; “Adverse effects include short or long-term, direct or indirect management-related, impacts of an individual or cumulative nature such as mortality, reduced growth or other adverse physiological changes, harassment of fish, physical disturbance of redds, reduced reproductive success, delayed or premature migration, or other adverse behavioral changes to listed anadromous salmonids at any life stage. Adverse effects to designated critical habitat include effects to any of the essential features of critical habitat that would diminish the value of the habitat for the survival and recovery of listed anadromous salmonids” (From *NMFS’ Pacfish Biological Opinion, 1/23/95*). Interpretation of part of the preceding quotation has been problematic. The statement “...impacts of an individual or cumulative nature...” has often been applied only to actions and impacts, not organisms. NMFS’ concern with this definition is that it does not clearly state that the described impacts include those to individual eggs or fish. However, this definition is useful if it is applied on the individual level as well as on the subpopulation and population levels.

For the purposes of Section 7, any action which has more than a negligible potential to result in “take” (see definition at bottom of Dichotomous Key, NMFS FIGURE 1) is likely to adversely affect a proposed/ listed species. It is not possible for NMFS or USFWS to concur on a “not likely to adversely affect” determination if the proposed action will cause take of the listed species. Take can be authorized in the Incidental Take Statement of a Biological Opinion after the anticipated extent and amount of take has been 0



respect to jeopardizing the species or adversely modifying critical habitat. *Take, as defined in the ESA, clearly applies to the individual level, thus actions that have more than a negligible potential to cause take of individual eggs and/or fish are "likely to adversely affect."*

### **"Likely to jeopardize the continued existence of"**

The regulations define jeopardy as "to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species" (50 CFR §402.02).

### **"Take"**

The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

## **Examples of Effects Determinations**

### **"No effect"**

NMFS is encouraging evaluators to conference/consult at the watershed scale (i.e., on all proposed actions in a particular watershed) rather than on individual projects. Due to the strict definition of "no effect" (above), the interrelated nature of in-stream conditions and watershed conditions, and the watershed scale of these conferences, consultations, and activities "no effect" determinations for all actions in a watershed could be rare when proposed/listed species are present in or downstream from a given watershed. This is reflected in the dichotomous key, however the evaluator may identify some legitimate exceptions to this general rule.

### **Example**

The proposed project is in a watershed where available monitoring information indicates that in-stream habitat is in good functioning condition and riparian vegetation is at or near potential. The proposed activity will take place on stable soils and will not result in increased sediment production. No activity will take place in the riparian zone.

### **"May affect, not likely to adversely affect"**

### **Example**

The proposed action is in a watershed where available monitoring information indicates that in-stream habitat is in good functioning condition and riparian vegetation is at or near potential. Past monitoring indicates that this type of action has led to the present condition (i.e., timely recovery has been achieved with the kind of management proposed in the action). Given available information, the potential for take to occur is negligible.

### **"May affect, likely to adversely affect"**

### **Example**

The proposed action is in a watershed that has degraded baseline conditions such as excess fine sediment, high cobble embeddedness, or poor pool frequency/quality. If the action will further degrade any of these pathways, the determination is clearly "likely to adversely affect".

A less obvious example would be a proposed action in the same watershed that is designed to improve baseline conditions, such as road obliteration or culvert repair. Even though the intent is to improve the degraded conditions over the long-term, if any short-term impacts (such as temporary turbidity and sedimentation) will cause take (adverse effects), then the determination is "likely to adversely affect."

NMFS Matrix - Table 1. Matrix of Pathways and Indicators

(Remember, the ranges of criteria presented here are not absolute, they may be adjusted for unique watersheds.

Pathway	Indicators	Properly Functioning	At Risk	Not Properly Functioning
Water Quality	Temperature	50-57° F	57-60° (spawning) 57-64° (migration & rearing)	> 60° (spawning) > 64° (migration & rearing)
	Sediment/Turbidity	<12% fines (8.5mm) in gravel, <sup>3</sup> turbidity low	12-17% (west-side) <sup>3</sup> , 12-20% (east-side) <sup>2</sup> , turbidity moderate	>17% (west-side) <sup>3</sup> , >20% (east side) <sup>2</sup> fines at surface or depth in spawning habitat, turbidity high
	Chemical Contamination/Nutrients	low levels of chemical contamination from agricultural, industrial and other sources, no excess nutrients, no CWA 303d designated reaches <sup>5</sup>	moderate levels of chemical contamination from agricultural, industrial and other sources, some excess nutrients, one CWA 303d designated reach <sup>5</sup>	high levels of chemical contamination from agricultural, industrial and other sources, high levels of excess nutrients, more than one CWA 303d designated reach <sup>5</sup>
Habitat Access	Physical Barriers	any man-made barriers present in watershed allow upstream and downstream fish passage at all flows	any man-made barriers present in watershed do not allow upstream and/or downstream fish passage at base/low flows	any man-made barriers present in watershed don't allow upstream and/or downstream fish passage at a range of flows
Habitat Elements	Substrate	dominant substrate is gravel or cobble (interstitial spaces clear), or embeddedness <20% <sup>3</sup>	gravel and cobble is subdominant, or if dominant, embeddedness 20-30% <sup>3</sup>	bedrock, sand, silt or small gravel dominant, or if gravel and cobble dominant, embeddedness >30% <sup>2</sup>
	Large Woody Debris	Coast: >80 pieces/mile >24" diameter >50 ft. length <sup>4</sup> ; East-side: >20 pieces/ mile >12" diameter >35 ft. length <sup>2</sup> ; and adequate sources of woody debris recruitment in riparian areas	currently meets standards for properly functioning, but lacks potential sources from riparian areas of woody debris recruitment to maintain that standard	does not meet standards for properly functioning and lacks potential large woody debris recruitment
	Pool Frequency	meets pool frequency standards (left) and large woody debris recruitment standards for properly functioning habitat (above)	meets pool frequency standards but large woody debris recruitment inadequate to maintain pools over time	does not meet pool frequency standards
	channel width			
	# pools/mile			
	5 feet	184		
	10"	96		
	15i	70		
	2"	56		
	25i	47		
	50i	26		
	75"	23		
	100i	18		
	Pool Quality	pools >1 meter deep (holding pools) with good cover and cool water <sup>3</sup> , minor reduction of pool volume by fine sediment	few deeper pools (>1 meter) present or inadequate cover/temperature <sup>2</sup> , moderate reduction of pool volume by fine sediment	no deep pools (>1 meter) and inadequate cover/temperature <sup>2</sup> , major reduction of pool volume by fine sediment



NMFS Table 1. Matrix of Pathways and Indicators. (continued)

*Remember, the ranges of criteria presented here are not absolute, they may be adjusted for unique watersheds.*

Pathway	Indicators	Properly Functioning	At Risk	Not Properly Functioning
Channel Condition & Dynamics	Off-channel Habitat	backwaters with cover, and low energy off-channel areas (ponds, oxbows, etc.) <sup>3</sup>	some backwaters and high energy side channels <sup>3</sup>	few or no backwaters, no off-channel ponds <sup>3</sup>
	Refugia (important remnant habitat for sensitive aquatic species)	habitat refugia exist and are adequately buffered (e.g., by intact riparian reserves); existing refugia are sufficient in size, number and connectivity to maintain viable populations or sub-populations <sup>7</sup>	habitat refugia exist but are not adequately buffered (e.g., by intact riparian reserves); existing refugia are insufficient in size, number and connectivity to maintain viable populations or sub-populations <sup>7</sup>	adequate habitat refugia do not exist <sup>7</sup>
	Width/Depth Ratio	<10 <sup>2,4</sup>	10-12 (we are unaware of any criteria to reference)	>12 (we are unaware of any criteria to reference)
	Streambank Condition	>90% stable; i.e., on average, less than 10% of banks are actively eroding <sup>2</sup>	80-90% stable	<80% stable
Flow/Hydrology	Floodplain Connectivity	off-channel areas are frequently hydrologically linked to main channel; overbank flows occur and maintain wetland functions, riparian vegetation and succession	reduced linkage of wetland, floodplains and riparian areas to main channel; overbank flows are reduced relative to historical frequency, as evidenced by moderate degradation of wetland function, riparian vegetation/succession	severe reduction in hydrologic connectivity between off-channel, wetland, floodplain and riparian areas; wetland extent drastically reduced and riparian vegetation/succession altered significantly
	Change in Peak/Base Flows	watershed hydrograph indicates peak flow, base flow and flow timing characteristics comparable to an undisturbed watershed of similar size, geology and geography	some evidence of altered peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography	pronounced changes in peak flow, baseflow and/or flow timing relative to an undisturbed watershed of similar size, geology and geography
	Increase in Drainage Network	zero or minimum increases in drainage network density due to roads <sup>8,9</sup>	moderate increases in drainage network density due to roads (e.g., 5%) <sup>8,9</sup>	significant increases in drainage network density due to roads (e.g., 20-25%) <sup>8,9</sup>
Watershed Conditions	Road Density & Location	<2 mi/mi <sup>2</sup> ≤11, no valley bottom roads	2-3 mi/mi <sup>2</sup> ≤, some valley bottom roads	>3 mi/mi <sup>2</sup> ≤, many valley bottom roads
	Disturbance History	<15% ECA (entire watershed) with no concentration of disturbance in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area (except AMAs), 15% retention of LSOG in watershed <sup>10</sup>	<15% ECA (entire watershed) but disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; and for NWFP area (except AMAs), 15% retention of LSOG in watershed <sup>10</sup>	>15% ECA (entire watershed) and disturbance concentrated in unstable or potentially unstable areas, and/or refugia, and/or riparian area; does not meet NWFP standard for LSOG retention

Riparian Reserves	the riparian reserve system provides adequate shade, large woody debris recruitment, and habitat protection and connectivity in all subwatersheds, and buffers or includes known refugia for sensitive aquatic species (>80% intact),and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/ composition >50% <sup>12</sup>	moderate loss of connectivity or function (shade, LWD recruitment, etc.) of riparian reserve system, or incomplete protection of habitats and refugia for sensitive aquatic species ( 70-80% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition 25-50% or better <sup>12</sup>	riparian reserve system is fragmented, poorly connected, or provides inadequate protection of habitats and refugia for sensitive aquatic species (<70% intact), and/or for grazing impacts: percent similarity of riparian vegetation to the potential natural community/composition <25% <sup>12</sup>
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<sup>1</sup> Bjornn, T.C. and D.W. Reiser. 1991. *Habitat Requirements of Salmonids in Streams*. American Fisheries Society Special Publication. 19:83-138. Meehan, W.R., ed.

<sup>2</sup> Biological Opinion on Land and Resource Management Plans for the: Boise, Challis, Nez Perce, Payette, Salmon, Sawtooth, Umatilla, and Wallowa-Whitman National Forests. March 1, 1995.

<sup>3</sup> Washington Timber/Fish Wildlife Cooperative Monitoring Evaluation and Research Committee, 1993. *Watershed Analysis Manual (Version 2.0)*. Washington Department of Natural Resources.

<sup>4</sup> Biological Opinion on Implementation of Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho, and Portions of California (PACFISH). National Marine Fisheries Service, Northwest Region, January 23, 1995.

<sup>5</sup> A Federal Agency Guide for Pilot Watershed Analysis (Version 1.2). 1994.

<sup>6</sup> USDA, Forest Service. 1994. Section 7 Fish Habitat Monitoring Protocol for the Upper Columbia River Basin.

<sup>7</sup> Frissell, C.A., W.J. Liss, and David Bayles. 1993. *An Integrated Biophysical Strategy for Ecological Restoration of Large Watersheds*. Proceedings from the Symposium on Changing Roles in Water Resource s Management and Policy. June 27-30, 1993. (American Water Resources Association), p. 449-456.

<sup>8</sup> Wemple, B.C. 1994. *Hydrologic Integration of Forest Roads with Stream Networks in Two Basins, Western Cascades, Oregon*. M.S. Thesis, Geosciences Department, Oregon State University.

<sup>9</sup> Example, see Elk River Watershed Analysis Report. 1995. Siskiyou National Forest, Oregon.

<sup>10</sup> Northwest Forest Plan. 1994. *Standards and Guidelines for Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. USDA Forest Service and USDI Bureau of Land Management.

<sup>11</sup> USDA, Forest Service. 1993. *Determining the Risk of Cumulative Watershed Effects Resulting from Multiple Activities*.

<sup>12</sup> Winward, A.H. 1989. *Ecological Status of Vegetation as a Base for Multiple Product Management*. Abstracts 42nd annual meeting, Billings, MT, Denver, CO: Society for Range Management: p.277.



**NMFS Table 2. Checklist for Documenting Environmental Baseline and Effect of Proposed Action(s) on Relevant Indicators.**

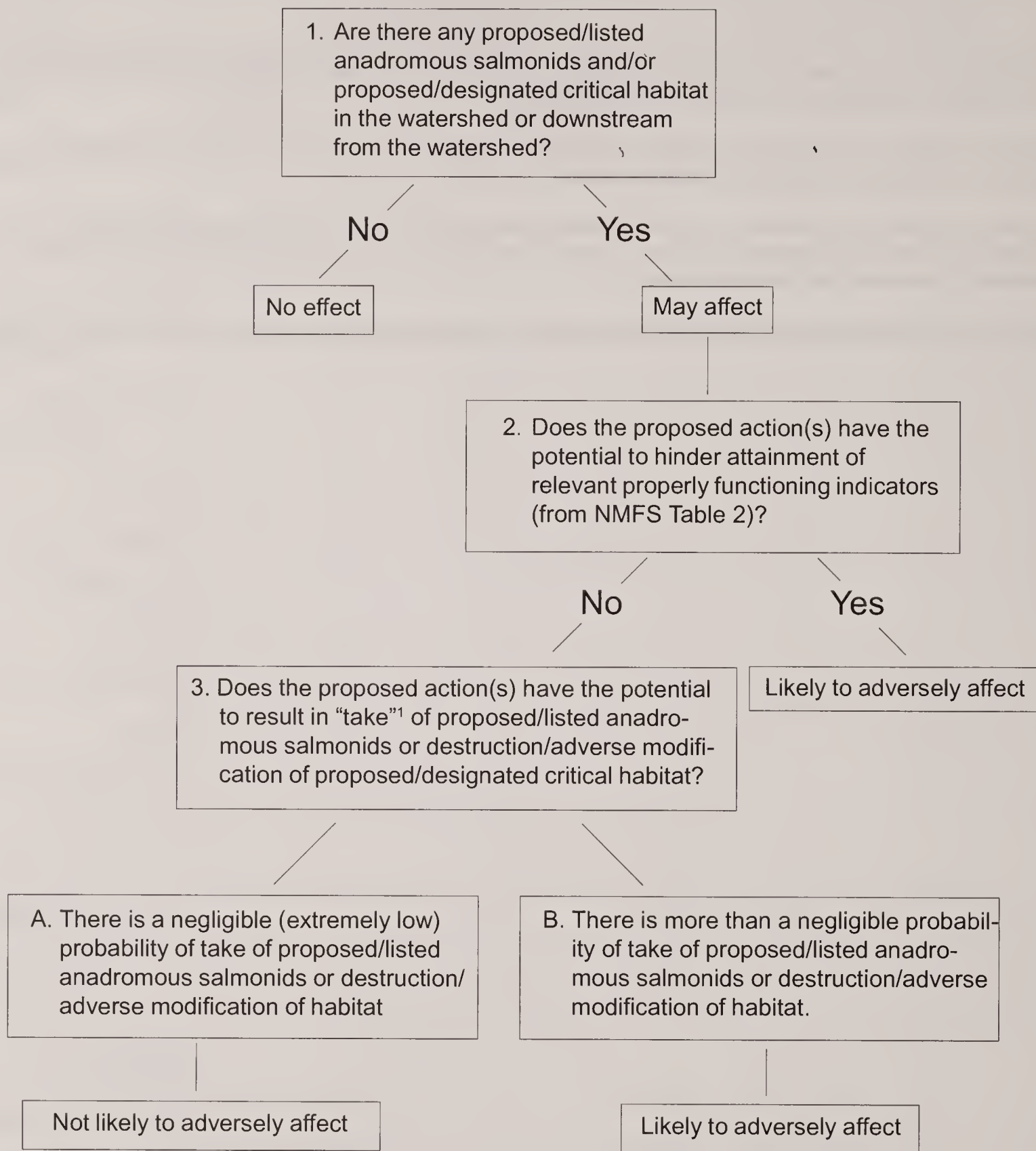
Diagnostics/ Pathways	Environmental Baseline			Effects of the Action(s)		
	Properly Functioning <sup>1</sup>	At Risk <sup>1</sup>	Not Properly Functioning <sup>1</sup>	Restore <sup>2</sup>	Maintain <sup>3</sup>	Degrade <sup>4</sup>
<b>Water Quality:</b>						
Temperature						
Sediment						
Chem. Contam./Nut.						
<b>Habitat Access:</b>						
Physical Barriers						
<b>Habitat Elements:</b>						
Substrate						
Large Wood Debris						
Pool Frequency						
Pool Quality						
Off-Channel Habitat						
Refugia						
<b>Channel Cond. &amp; Dyn:</b>						
Width/Depth Ratio						
Stream Bank Cond.						
Floodplain Connectivity						
<b>Flow Hydrology:</b>						
Peak/Base Flows						
Drainage Network Increase						
<b>Watershed Conditions:</b>						
Road Dens. & Loc.						
Disturbance History						
Riparian Reserves						
<b>Watershed Name:</b>	<b>Location:</b>					

**NMFS Table 2. Checklist for Documenting Environmental Baseline and Effect of Proposed Action(s) on Relevant Indicators. (continued)**

- <sup>1</sup> These three categories of function (“properly functioning,” “at risk,” and “not properly functioning”) are defined for each indicator in the “Matrix of Pathways and Indicators” (NMFS Table 1).
- <sup>2</sup> For the purposes of this checklist, “restore” means to change the function of an “at risk” indicator to “properly functioning”, or to change the function of a “not properly functioning” indicator to “at risk” or “properly functioning” (i.e., it does not apply to “properly functioning” indicators).
- <sup>3</sup> For the purposes of this checklist, “maintain” means that the function of an indicator does not change (i.e., it applies to all indicators regardless of functional level).
- <sup>4</sup> For the purposes of this checklist, “degrade” means to change the function of an indicator for the worse (i.e., it applies to all indicators regardless of functional level). In some cases, a “not properly functioning” indicator may be further worsened, and this should be noted.



NMFS Figure 1. Dichotomous Key for Making ESA Determination of Effects



<sup>1</sup> "Take" - The ESA (Section 3) defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct". The USFWS (USFWS, 1994) further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering", and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering".

# NMFS Appendix A: Overview of Some Key Habitat Elements and Activities Affecting Them

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The following are excerpts from A Coarse Screening Process For Potential Application in ESA Consultations (CRITFC, 1994). The excerpts are intended to stimulate the biologist's thought processes into evaluating all of the pathways through which habitat degradation could occur. Unfortunately this is not an all inclusive list. However, it is a start. We recommend that biologists review the entire "Coarse Screening" document and any other documents that are available to them. The "Coarse screening" document is available from The National Marine Fisheries Service, Portland, Oregon. We also highly recommend reviewing a report prepared by ManTech Environmental Research Services Corporation while under contract to the National Marine Fisheries Service (NMFS), Environmental Protection Agency and US Fish and Wildlife Service. The document is entitled "An Ecosystem Approach to Salmonid Conservation". This document is also available from the NMFS in Portland, Oregon.

## Channel Substrate

"Salmon survival and production are reduced as fine sediment increases, producing multiple negative impacts on salmon at several life stages. Increased fine sediment entombs incubating salmon in redds, reduces egg survival by reducing oxygen flow, alters the food web, reduces pool volumes for adult and juvenile salmon, and reduces the availability of rearing space for juveniles rendering them more susceptible to predation. Reduced survival-to-emergence (STE) for salmon caused by elevated fine sediment increases is of particular concern because it is a source of density-independent mortality that can have extremely significant negative effects on salmon populations even at low seeding.

The rearing capacity of salmon habitat is decreased as cobble embeddedness levels increase. Overwinter rearing habitat may be a major limiting factor to salmon production and survival. The loss of overwintering habitat may result in increased levels of mortality during rearing life stages."

## Channel Morphology

"Available data indicate that the production of salmon is reduced as pool frequency and volume decrease. Large pools are required by salmon during rearing, spawning, and migration. Pools provide thermal refugia, velocity refugia during storm events, resting habitat for migrating salmon, and important rearing habitat for juvenile salmon."

"Fine sediment is deposited in pools during waning flows. Residual pool volume is the volume of a pool not filled by fine sediment accumulations. Fine sediment volumes in pools reduce pool quality and reduce residual pool volumes (the pool volume available for salmon use)."

"Available data indicate that salmon production increases as Large Woody Debris (LWD) increases. LWD provides cover, velocity refugia, and plays a vital role in pool formation and the maintenance of channel complexity required by salmon in natal habitat. LWD also aids in reducing channel erosion and buffering sediment inputs by providing sediment storage in headwater streams."

## Bank Stability

"Bank stability is of prime importance in maintaining habitat conditions favoring salmon survival. Bank instability increases channel erosion that can lead to increased levels of fine sediment and the in-filling of pools. Unstable banks can lead to stream incisement that can reduce baseflow contributions from groundwater and increase water temperature. Bank instability can cause channel widening that can significantly exacerbate seasonal water temperature extremes and destabilize LWD."

## Water Temperature

"Available information indicates that the elevation of summer water temperatures impairs salmon production at scales ranging from the reach to the stream network and puts fish at greater risk through a variety



of effects that operate at scales ranging from the individual organism to the aquatic community level. Maximum summer water temperatures in excess of 60°F impair salmon production. However, many smaller streams naturally have much lower temperatures and these conditions are critical to maintaining downstream water temperatures. At the stream system level, elevated water temperatures reduce the area of usable habitat during the summer and can render the most potentially productive and structurally complex habitats unusable. Decreases in winter water temperatures also put salmon at additional risk. The loss of vegetative shading is the predominant cause of anthropogenically elevated summer water temperature. Channel widening and reduced baseflows exacerbate seasonal water temperature extremes. Elevated summer water temperatures also reduce the diversity of coldwater fish assemblages."

## Water Quantity and Timing

"The frequency and magnitude of stream discharge strongly influence substrate and channel morphology conditions, as well as the amount of available spawning and rearing area for salmon. Increased peak flows can cause redd scouring, channel widening, stream incisement, increased sedimentation. Lower streamflows are more susceptible to seasonal temperature extremes in both winter and summer. The dewatering of reaches can block salmon passage."

## Some Major Activities and their Effects

### Logging

Regional differences in climate, geomorphology, soils, and vegetation may greatly influence timber harvest effects on streams of a given size. However, some broad generalizations can be made on how timber harvest affects the hydrologic cycle, sediment input, and channel morphology of streams:

1. *Hydrologic cycle.* Timber harvest often alters normal streamflow patterns, particularly the volume of peak flows (maximum volume of water in the stream) and base flows (the volume of water in the stream representing the groundwater contribution). The degree these parameters change depend on the percentage of total tree cover removed from the watershed and the amount of soil disturbance caused by the harvest, among other things. For example, if harvest activities remove a high percentage of tree cover and cause light soil disturbance and compaction, rain falling on the soil will infiltrate normally. However, due to the loss of tree cover, evapotranspiration (the loss of water by plants to the atmosphere) will be much lower than before. Thus, the combination of normal water infiltration into the soil and greatly decreased uptake and loss of water by the tree cover results in substantially higher, sustained streamflows. Hence, this type of harvest results in higher base flows during dry times of the year when evapotranspiration is high, but does not greatly affect peak flows during wet times of the year because infiltration has not decreased and evapotranspiration is low. On the other hand, if the harvest activities cause high soil disturbance and compaction, little rainfall will be able to penetrate the soil and recharge groundwater. This results in higher surface runoff and equal or slightly higher base flows during dry times of the year. During wet times of the year, the compacted soils deliver high amounts of surface runoff, substantially increasing peak flows. In general, timber harvest on a watershed-wide scale results in water moving more quickly through the watershed (i.e., higher runoff rates, higher peak and base flows) because of decreased soil infiltration and evapotranspiration. This greatly simplified model only partly illustrates the complex hydrologic responses to timber harvest (Chamberlain et al. 1991, Gordon et al. 1992).
2. *Sediment input.* Timber harvest activities such as road-building and use, skidding logs, clear-cutting, and burning increase the amount of bare compacted soil exposed to rainfall and runoff, resulting in higher rates of surface erosion. Some of this hillside sediment reaches streams via roads, skid trails, and/or ditches (Chamberlain et al. 1991). Appropriate management precautions such as avoiding timber harvest in very wet seasons, maintaining buffer zones below open slopes, and skidding over snow can decrease the amount of surface erosion (Packer 1967). Harvest activities can also greatly increase the likelihood of mass soil movements occurring, particularly along roads and on clear-cuts in steep terrain (Furniss et al. 1991, O'Loughlin 1972). Increased surface erosion and mass soil movements associated with timber harvest areas can result in an increase in sediment input to streams. Fine sediment may infiltrate into relatively clean streambed gravels or, if the supply of fine sediment is large, settle deeper into the streambed (Chamberlain et al. 1991).



3. *Stream channel morphology.* The hydrologic and sedimentation changes discussed above can influence a stream's morphology in many ways. Substantial increases in the volume and frequency of peak flows can cause streambed scour and bank erosion. A large sediment supply may cause aggradation of the stream channel, pool filling, and a reduction in gravel quality (Madej 1982). Streambank destabilization from vegetation removal, physical breakdown, or channel aggradation adds to sediment supply and generally results in a loss of stream channel complexity (Scrivener 1988). In addition, losses of in-stream large woody debris supplies (i.e., removal of riparian trees) also result in less channel complexity as wood-associated scour pools decrease in size and disappear (Chamberlain et al. 1991).

## Roads

"Roads are one of the greatest sources of habitat degradation. Roads significantly elevate on-site erosion and sediment delivery, disrupt subsurface flows essential to the maintenance of baseflows, and can contribute to increased peakflows. Roads within riparian zones reduce shading and disrupt LWD sources for the life of the road. These effects degrade habitat by increasing fine sediment levels, reducing pool volumes, increasing channel width and exacerbating seasonal temperature extremes."

## Grazing

The impacts of livestock grazing to stream habitat and fish populations can be separated into acute and chronic effects. Acute effects are those which contribute to the immediate loss of individual fish, and loss of specific habitat features (undercut banks, spawning beds, etc.) or localized reductions in habitat quality (sedimentation, loss of riparian vegetation, etc.). Chronic effects are those which, over a period of time, result in loss or reductions of entire populations of fish, or widespread reductions in habitat quantity and/or quality.

### Acute Effects

Acute effects to habitat include compacting stream substrates, collapse of undercut banks, destabilized streambanks and localized reduction or removal of herbaceous and woody vegetation along streambanks

and within riparian areas (Platts 1991). Increased levels of sediment can result through the resuspension of material within existing stream channels as well as increased contributions of sediment from adjacent streambanks and riparian areas. Impacts to stream and riparian areas resulting from grazing are dependent on the intensity, duration, and timing of grazing activities (Platts 1989) as well as the capacity of a given watershed to assimilate imposed activities, and the pre-activity condition of the watershed (Odum 1981).

### Chronic Effects

Chronic effects of grazing result when upland and riparian areas are exposed to activity and disturbance levels that exceed assimilative abilities of a given watershed. Both direct and indirect fish mortality are possible, and the potential for mortality extends to all life cycle phases. As an example, following decades of high intensity season-long grazing on BLM lands in the Trout Creek Mountains of southeast Oregon, the Whitehorse Creek watershed had extensive areas of degraded upland and riparian habitat (BLM 1992). An extreme rain-on-snow event in late winter 1984 and subsequent flooding of area streams flushed adult and juvenile trout through area streams and into Whitehorse Ranch fields and the adjacent desert.

Although less extreme, increases in stream temperature and reduced allochthonous inputs following removal of riparian vegetation, increased sedimentation, and decreased water storage capacity work together to reduce the health and vigor of stream biotic communities (Armour et al. 1991, Platts 1991, Chaney et al. 1990). Increased sediment loads reduce primary production in streams. Reduced instream plant growth and riparian vegetation limits populations of terrestrial and aquatic insects. Persistent degraded conditions adversely influence resident fish populations (Meehan 1991).

## Mining

"Mining activities can cause significant increases in sediment delivery. While mining may not be as geographically pervasive as other sediment-producing activities, surface mining typically increases sediment delivery much more per unit of disturbed area than other activities (Dunne and Leopold, 1978; USFS, 1980; Richards, 1982; Nelson et al. 1991) due to the level of disruption of soils, topography, and vegetation. Relatively small amounts of mining can increase sediment delivery significantly."



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# NMFS Appendix B: Species Narrative

## Umpqua River Sea-Run Cutthroat Trout (*Oncorhynchus clarki*)

Endangered Species Act Status: Proposed Endangered, July 8, 1994, Umpqua River Basin, in Southwestern Oregon. All life forms are included in this proposal.

### Description

Sea-run cutthroat trout is a profusely spotted fish which often has red or sometimes orange slash marks on each side of the lower jaw. Coastal sea-run cutthroat trout often lose the cutthroat marks when in seawater. Some other trouts, such as Apache trout, Gila trout and Redband trout may also have yellowish or red slash marks. Other identifying marks include; the presence of basibranchial teeth, located on the basibranchial plate behind the tongue. The upper jaw is typically more than half the length of the head with the eye being well forward of the back of the maxilla.

The spots on cutthroat trout are small to medium, irregularly shaped, dispersed evenly over the entire body including the belly and anal fin. Coloration of sea-run fish is often silvery with a slight yellow tint. This silver coloration often masks the spots. Sea-run fish darken and take on spots after a period in freshwater. Freshwater fish are often more colorful with pale yellow colors on the body and red-orange or yellow on the lower fins. The gill plates sides and ventral areas may tinted a rosy color as spawning time draws nearer (description from Stolz and Schnell, 1991).

### Distribution

Coastal cutthroat trout range from northern California to the Gulf of Alaska. The distribution of the proposed Umpqua River Sea-run cutthroat trout is the greater Umpqua River Basin located in Douglas County in southwestern Oregon. The Umpqua River

Basin stretches from the Cascade Mountains in the east to the Pacific Ocean at Reedsport, Oregon. The drainages of the North and South Umpqua Rivers together make up about 2/3 of the greater Basin drainage, and each river is about 170 km long. The mainstem Umpqua River flows in a northwesterly direction another 180 km to the ocean. Together, the three rivers form one of the longest coastal basins in Oregon, approximately 340 km in length, with a drainage area of over 12,200 sq. km. Major tributaries of the mainstem Umpqua River include Calapooya (River Kilometer [Rkm] 164), Elk (Rkm 78), and Scholfield Creeks (Rkm 18) and the Smith River (Rkm 18). The estuary of the Umpqua River is one of largest on the Oregon coast and has a large seawater wedge that extends as far inland as Scottsburg, Oregon at Rkm 45 (From Status Review For Oregon's Umpqua River Sea-Run Cutthroat Trout, Johnson et al. 1994).

### Life Forms

#### Sea-Run (Anadromous) Cutthroat Trout

Cutthroat trout have evolved to exploit habitats least preferred by other salmonid species (Johnston 1981). Unlike other anadromous salmonids, sea-run cutthroat trout do not over-winter in the ocean and only rarely make long extended migrations across large bodies of water. They migrate in the nearshore marine habitat and usually remain within 10 km of land (Sumner 1972, Giger 1972, Jones 1976, Johnston 1981). While most anadromous cutthroat trout enter seawater as 2- or 3-year-olds, some may remain in fresh water for up to 5 years before entering the sea (Sumner 1972, Giger 1972).

#### Resident (Nonmigratory) Cutthroat Trout

Some cutthroat trout do not migrate long distances; instead, they remain in upper tributaries near spawning and rearing areas and maintain small home territories (Trotter 1989). Resident cutthroat trout have been observed in the upper Umpqua River drainage (Roth 1937, FCO and OSGC 1946, ODFW 1993a).



During a radio tagging study Waters (1993) found that fish smaller than 180mm maintained home ranges of less than 14m of stream length and moved about an average of 27m during the study. Fish larger than 180mm had home ranges of about 76m and moved an average total distance of about 166m. This study was conducted in three tributaries of Rock Creek on the North Umpqua River drainage (In Johnson et al. 1994).

### **River-Migrating (Potamodromous) Cutthroat Trout**

Some cutthroat trout move within large river basins but do not migrate to the sea.

## **Life History/Migration**

The following descriptions are condensed from status review (Johnson et al. 1994)

Cutthroat trout spawning occurs between December and May and eggs begin to hatch within 6-7 weeks of spawning, depending on temperature. Alevins remain in the redds for a further few weeks and emerge as fry between March and June, with peak emergence in mid-April (Giger 1972, Scott and Crossman 1973). Newly emerged fry are about 25 mm long. They prefer low velocity margins, backwaters, and side channels, gradually moving into pools if competing species are absent. If coho fry are present they will drive the smaller cutthroat fry into riffles, where they will remain until decreasing water temperatures reduce the assertiveness of the coho fry (Stolz and Schnell, 1991). In winter, cutthroat trout go to pools near log jams or overhanging banks (Bustrad and Narver 1975).

## **Parr Movements**

After emergence from redds, cutthroat trout juveniles generally remain in upper tributaries until they are 1 year of age, when they may begin extensive movement up and down streams.

Directed downstream movement by parr usually begins with the first spring rains (Giger 1972) but has been documented in every month of the year (Sumner 1953, 1962, 1972; Giger 1972; Moring and Lantz 1975; Johnston and Mercer 1976; Johnston 1981). As an example, from 1960 to 1963 (Lowry 1965) and from 1966 to 1970 (Giger 1972) in the Alsea River drainage, large downstream migrations of juvenile fish began in

mid-April with peak movement in mid-May. Some juveniles (parr) even entered the estuary and remained there over the summer, although they did not smolt nor migrate to the open ocean (Giger 1972). In Oregon, upstream movement of juveniles from estuaries and mainstem to tributaries begins with the onset of winter freshets during November, December, and January. (Giger 1972, Moring and Lantz 1975). At this time, these 1-year and older juvenile fish averaged less than 200 mm in length.

## **Smoltification**

Time of initial seawater entry of smolts bound for the ocean varies by locality and may be related to marine conditions or food sources (Lowry 1965, 1966; Giger 1972; Johnston and Mercer 1976; Trotter 1989). In Washington and Oregon, entry begins as early as March, peaks in mid-May, and is essentially over by mid-June (Sumner 1953, 1972; Lowry 1965; Giger 1972; Moring and Lantz 1975; Johnston 1981). Seaward migration of smolts to protected areas appears to occur at an earlier age and a smaller size than to more exposed areas. On the less protected Oregon coast, cutthroat trout tend to migrate at an older age (age 3 and 4) and at a size of 200 to 255 mm (Lowry 1965, 1966; Giger 1972).

## **Timing of Smolt Migrations in the Umpqua River**

Trap data from seven locations in the North Umpqua River in 1958 and from three locations in Steamboat Creek (a tributary of the North Umpqua River downstream of Soda Springs Dam) between 1958 and 1973 indicate that juvenile movement is similar to that reported by Lowry (1965) and Giger (1972) in other Oregon coastal rivers. Movement peaked in May and June, with a sharp decline in July, although some juveniles continued to be trapped through September and October. It is unknown whether Umpqua River cutthroat trout juveniles migrate from the upper basin areas to the estuary, but it seems unlikely considering the distance (well over 185 km) and the river conditions (average August river temperature at Winchester Dam (located on the main Umpqua River where the Interstate 5 highway crosses the Umpqua) since 1957 is 23.3°C) (ODFW 1993a).

## Estuary and Ocean Migration

Migratory patterns of sea-run cutthroat trout differ from Pacific salmon in two major ways: few, if any, cutthroat overwinter in the ocean, and the fish do not usually make long open-ocean migrations, although they may travel considerable distances along the shoreline (Johnston 1981, Trotter 1989, Pauley et al. 1989). Studies by Giger (1972) and Jones (1973, 1974, 1975) indicated that cutthroat trout, whether initial or seasoned migrants, remained at sea an average of only 91 days, with a range of 5 to 158 days.

## Adult Freshwater Migrations

In the Umpqua River, it is reported (ODFW 1993a) that cutthroat trout historically began upstream migrations in late June and continued to return through January with bimodal peaks in late-July and October. Giger (1972) reported a similar return pattern, but with slightly later modal peaks (mid-August and late-October to mid-November) on the Alsea River.

## Spawning/Rearing

Cutthroat trout generally spawn in the tails of pools located in small tributaries at the upper limit of spawning and rearing sites of coho salmon and steelhead. Streams conditions are typically low stream gradient and low flows, usually less than 0.3 m<sup>3</sup>/second during the summer (Johnston 1981). Spawn timing varies among streams, but generally occurs between December and May, with a peak in February (Trotter 1989).

Cutthroat trout are iteroparous and have been documented to spawn each year for at least 5 years (Giger 1972), although some cutthroat trout do not spawn every year (Giger 1972) and some do not return to seawater after spawning, but remain in fresh water for at least a year (Giger 1972, Tomasson 1978). Spawners may experience high post-spawning mortality due to weight loss of as much as 38% of pre-spawning mass (Sumner 1953) and other factors (Cramer 1940, Sumner 1953, Giger 1972, Scott and Crossman 1973).

## Food

In streams cutthroat trout feed mainly on terrestrial and aquatic insects that come to them in the drift. When in the marine environment cutthroat trout feed around gravel beaches, off the mouths of small creeks and beach trickles, around oyster beds and patches of eel grass. They primarily feed on amphipods, isopods, shrimp, stickelback, sand lance and other small fishes. (Stolz and Schnell, 1991)

## Additional Information

Much of what is presented here was taken from two sources. They are the *Status Review for Oregon's Umpqua River Sea-Run Cutthroat Trout*, June 1994, available from the National Marine Fisheries Service, Northwest Fisheries Science Center, Coastal Zone and Estuarine Studies Division, 2725 Montlake BLVD. E., Seattle, WA 98112-2097 and the book *The Wildlife Series, Trout*, Edited by Judith Stolz and Judith Schnell, Stackpole Books, Cameron and Kelker Streets, P.O. Box 1831, Harrisburg, PA 17105 (ISBN number 0-8117-1652-X). Both documents contain a lot more information for those that are interested.



# NMFS Appendix C

## A Comparison Between ACS Objectives, Ecological Goals, and the Pathways and Indicators Used in the Effects Matrix.

Aquatic Conservation Strategy Objectives - Northwest Forest Plan	Ecological Goals - Snake River Recovery Plan/LRMP	Pathways/Indicators
2, 4, 8, 9	2, 5, 9, 10	Water Quality / Temperature
4, 5, 6, 8, 9	5, 6, 7, 9, 10	Water Quality/Sediment./Turbidity
2, 4, 8, 9	2, 5, 9, 10	Water Quality/Chemical Concentration/Nutrients
2, 6, 9	2, 7, 10	Habitat Access/Physical Barriers
3, 5, 8, 9	3, 6, 9, 10	Habitat Elements/Substrate
3, 6, 8, 9	3, 4, 7, 9, 10	Habitat Elements/Large Woody Debris
3, 8, 9	3, 4, 9, 10	Habitat Elements/Pool Frequency
3, 5, 6, 9	3, 4, 6, 7, 10	Habitat Elements/Pool Quality
1, 2, 3, 6, 8, 9	1, 2, 3, 7, 9, 10	Habitat Elements/Off-Channel Habitat
1, 2, 9	1, 2, 10	Habitat Elements/Refugia
3, 8, 9	3, 9, 10	Channel Condition/Dynamics/Width/Depth Ratio
3, 8, 9	3, 9, 10	Channel Condition/Dynamics/Streambank Condition
1, 2, 3, 6, 7, 8, 9	1, 2, 3, 7, 8, 9, 10	Channel Condition/Dynamics/Floodplain Connectivity
5, 6, 7	6, 7, 8	Flow/Hydrology/Change in Peak/Base Flow
2, 5, 6, 7	2, 6, 7, 8	Flow/Hydrology/Increase in Drainage Network
1, 3, 5	1, 3, 6	Watershed Conditions/Road Density & Location
1, 5	1, 6	Watershed Conditions/Disturbance History
1, 2, 3, 4, 5, 8, 9	1, 2, 3, 4, 5, 6, 9, 10	Watershed Conditions/Riparian Reserves

# NMFS Appendix D: ACS Objectives and Ecological Goals

## ACS Objectives

Forest Service and BLM-administered lands within the range of the northern spotted owl will be managed to:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
4. Maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
5. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
6. Maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected.
7. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
8. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient

filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.

9. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

## Ecological Goals

NMFS restated, refined, and expanded the PACFISH goals to provide added detail on ecological function needed for listed salmon and to include landscape and habitat connectivity perspectives. These goals provide consistency with NMFS' basin-wide Ecological Goals for all Federal land management agencies contained in the Proposed Recovery Plan for Snake River Salmon. Consistency with these goals will help NMFS determine whether land management actions avoid jeopardy or adverse modification of critical habitat during watershed-scale and project-scale consultations. However, although consistency with the goals and their associated guidelines generally is necessary to achieve informal concurrence under section 7 of the Endangered Species Act, concurrence cannot be guaranteed since the goals and other guidance were not structured to eliminate short-term adverse effects. Also, some of the guidelines (particularly with regard to grazing, mining, and how to proceed following watershed analysis) are not specific enough to eliminate the requirement for project-specific interpretation and analysis. The goals and guidelines described below do not include NMFS' long-term expectations for the eastside environmental impact statements. The Ecological Goals are as follows:

1. Maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.
2. Maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands,



- upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.
3. Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.
  4. Maintain and restore timing, volume and distribution of large woody debris (LWD) recruitment by protecting trees in riparian habitat conservation areas. Addition of LWD to streams is inappropriate unless the causes of LWD deficiency are understood and ameliorated.
  5. Maintain and restore the water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain within the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.
  6. Maintain and restore the sediment regime under which aquatic ecosystems evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport.
  7. Maintain and restore instream flows sufficient to create and sustain riparian, aquatic, and wetland habitats, retain patterns of sediment, nutrient, and wood routing, and optimize the essential features of designated critical habitat. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows should be maintained, where optimum, and restored, where not optimum.
  8. Maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands.
  9. Maintain and restore the species composition and structural diversity of plant communities in riparian areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability.
  10. Maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

# Appendix 10

# Implementation Framework

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## Key Terms Used in This Section

**Adaptive Management** - A type of natural resource management in which decisions are made as part of an on-going process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society. Results are used to modify management policy. *(Note: this definition differs from that sometimes used in scientific literature.)*

**Regional Executives** - A group representing the federal agency offices within the project area that provide guidance and direction to the Interior Columbia Basin Ecosystem Management Project (ICBEMP). They include: Bureau of Land Management (BLM) state directors, Forest Service regional foresters, Forest Service research station directors, regional director of the U.S. Fish and Wildlife Service, and regional administrators of the National Marine Fisheries Service and Environmental Protection Agency.

**Monitoring** - A process of collecting information to evaluate whether or not objectives of a project and its mitigation plan are being realized.

**Evaluation** - An essential companion activity to monitoring; the tool for translating data gathered by monitoring into useful information that could result in change or adaptive management.

**Subbasin** - Equivalent to a 4th-field Hydrologic Unit Code (HUC), a drainage area of approximately 800,000 to 1,000,000 acres.

**Subwatershed** - Equivalent to a 6th-field HUC, a drainage area of approximately 20,000 acres. Hierarchically, subwatersheds (6th-field HUC) are contained within a watershed (5th-field HUC), which in turn is contained within a subbasin (4th-field HUC). This concept is shown graphically in Figure 2-1 in Chapter 2.

**Watershed** - (1) The region draining into a river, river system, or body of water; (2) in this EIS, a watershed also refers to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th-field HUC.

# Introduction

This appendix addresses implementation issues to be finalized by the Record of Decision (ROD). The implementation process must be adaptive because natural resource conditions change over time, particularly in the disturbance-driven ecosystems covered by the Interior Columbia Basin Ecosystem Management Project (ICBEMP). Knowledge evolves, as do public values, thus adding to the need for an adaptive management approach. Two vital elements of adaptive management are monitoring and evaluation. These aspects of adaptive management are discussed in more detail in this appendix.

This appendix is a framework to identify and guide the development work between the Supplemental Draft and Final EIS, and to add clarity to the implementation expectations. It is a start in the process, not a completed product. This framework is focused on the action alternatives (Alternatives S2 and S3). Implementation of Alternative S1 the No-Action alternative, would require continuation of existing processes. The intent is to identify the “new” processes associated with the action alternative. The implementation framework included in the Final EIS will focus on the selected alternative.

This appendix is composed of four main sections:

- ♦ The Nature of Decisions;
- ♦ Implementation Process;
- ♦ Monitoring, Evaluation, and Adaptive Management Framework; and
- ♦ Challenges to Implementation.

## The Nature of Decisions

### What the Decision Will Provide

As explained in Chapter 1 of the Supplemental Draft EIS, the ICBEMP Record of Decision (ROD) will provide the large-scale ecological context for Forest Service and Bureau of Land Management (BLM) land use plans. It also will help clarify the relationship of agency activities to ecosystem capabilities and will

help develop realistic expectations for the production of economic and social benefits. Most decisions in the ROD will focus on regional and subregional issues and establish desired landscape patterns, structure, and succession and disturbance regimes to address the issues. The ROD also will help establish general direction for management of habitat for species or groups of species that require integrated management across broad landscapes to assure viability. For the most part, fine-scale decisions will be deferred to individual administrative units after appropriately scaled NEPA analysis. Those decisions must be made within the context of the broad-scale direction in this EIS.

### What the Decision Will Not Provide

Broad-scale decisions made through the ICBEMP Record of Decision will guide subsequent decisions made by local Forest Service and BLM managers. Many other decisions are not appropriately made at the scale, or within the scope, of this decision, and therefore will not be included in the ROD. Examples of these types of decisions include:

- ♦ *Statutory requirements.* The decision would not change the agencies' responsibility to comply with the Clean Air Act, Clean Water Act, Endangered Species Act, NEPA, or any other federal law.
- ♦ *National policy.* The decision would not change the agencies' obligation to conform with national policy. No change, for example, would be made in the requirement for all levels of planning activities to be conducted in close coordination with potentially affected American Indian tribes.
- ♦ *Specific allocations of resource products.* The allocation of allowable cut for timber or animal unit months (AUMs) of forage for livestock are made at the individual land use plan or activity plan level.
- ♦ *Activity plan level decisions.* The amount and restrictions for grazing in a specific allotment will continue to be determined locally in consultation with affected parties.
- ♦ *Funding levels and allocations.* The decision addresses broad scale management direction (management intent, objectives, standards, and guidelines) not funding levels. Funding levels and allocations are made through separate administrative processes that are influenced by this decision, but are not directed by it.



- ♦ *Project plan level decisions.* Examples include: the actual types, location, and timing of treatments to eradicate noxious weeds; the location and timing of prescribed fire activities; the location and timing of road and trail maintenance and rehabilitation activities.
- ♦ *Administrative actions for which a land use plan decision is not needed.* For example, a Memorandum of Understanding regarding collaboration among the five federal agencies represented on the ICBEMP Regional Executive Steering Committee has been agreed to. Also, the agencies have collaborated on and prototyped a basin-wide protocol for addressing waters listed under section 303(d) of the Clean Water Act.

## Decision Elements

Specific decisions involved in the selection of an alternative include adoption of:

- ♦ Management goals;
- ♦ Management direction, including statements of *management intent*, *objectives* to be used in measuring progress toward attainment of the management goals, and *standards*, which are requirements to be used in designing and implementing future management actions;
- ♦ Geographic delineations, such as aquatic A1 and A2 subwatersheds and terrestrial T watersheds;
- ♦ A monitoring plan, mitigation measures, and other items documented in the ROD.

Guidelines, which are optional techniques that should prove useful in meeting the objectives, are also included in the decision. See Chapter 3 for more information on the alternatives and their components.

At this broad scale, the alternatives do not specify the types or level of management activities (for example, acres of rangeland improvement or prescribed burning) that would be needed to achieve the objectives in Chapter 3. Instead, they describe the emphasis, intent, and desired outcomes for the different conditions and areas delineated within the project area. In addition, story lines (see Appendix 14) were prepared to assist the Science Advisory Group in modeling the effects of the alternatives. The story lines depict a possible implementation scenario by indicating the probability and rate of occurrence for several activities at a given funding level.

## Compliance with the National Environmental Policy Act and Other Laws

This EIS complies with the National Environmental Policy Act for the broad-scale decisions that will be made in the ROD. It does not replace the requirement to comply with NEPA, where necessary, for implementation actions. The agencies will continue to prepare environmental assessments (EAs) and environmental impact statements (EISs) as part of decision-making and planning processes. These subsequent EISs and EAs will tier to the ICBEMP EIS, when appropriate.

Vital to the successful implementation of the selected alternative will be compliance with other federal acts that affect management of national forests and BLM-administered public land. The intent of the ROD is to provide basin-wide direction designed to aid in compliance with the Endangered Species Act, Clean Water Act, Clean Air Act, and other laws (see Appendix 1). Specific on-the-ground actions to achieve compliance will be determined through the tiered process of analysis and decision making established by the ROD.

Various federal laws and obligations — such as the Clean Water Act, Clean Air Act, Endangered Species Act, federal trust responsibilities, and the National Forest Management Act (NFMA) — as well as certain state laws have minimum requirements or conditions (such as meeting the viability requirement of the NFMA, water temperature standards of the Clean Water Act, or emission standards from the Clean Air Act) that must be attained prior to or while conducting management activities. While these define the lower limits of the decision space, the upper limit often is bounded by the biological potential, or maximum capabilities of the land and resources. This allows for a range of management options between the minimum legal requirements and the biological potential. Generally, after legal requirements are satisfied the range of options is narrow and precludes maximization of any specific value, except where risks are high or where rare and sensitive habitats exist.



## Management Priorities

Management priorities are described in Chapter 1 of this EIS. They include: protecting ecosystems, restoring deteriorated ecosystems, and providing multiple benefits to people within the capabilities of ecosystems.

With the diversity of issues, resources, conditions, trends, and communities within the project area, there is no simple solution to ambiguities or conflicts that may arise through implementation at the field level. Management priorities and direction outlined in the ICBEMP EIS and ROD will provide the context, framework, or umbrella for local decision making. Local managers need the flexibility to work within this umbrella to adapt priorities and direction to local conditions such that outcomes can be most effective.

A process for using information from multiple scales to aid in decision making will be implemented as described in the Linking Broad-scale Decisions and Information to Finer Levels section of this appendix. This “step-down” process is designed to ensure that final commitments of actions to meet broad-scale goals and objectives are made only after considering local conditions and is specific to the action attending S2 and S3. In essence, the step-down process is a risk management approach to address risks at different scales. Step-down will enhance the understanding of risk and opportunities and will provide a hierarchically scaled context and information base of support for site-specific analysis and decisions. It will facilitate the analysis of cumulative effects when individual project decisions are made.

A feedback mechanism—called monitoring and evaluation—enables managers to compile information about implementation and aggregate it upward to determine if the cumulative results of implementation are as desired or expected. This monitoring and evaluation process will examine whether existing conditions match those projected, and whether progress is being made toward achieving the desired conditions. It will include a determination of whether the levels of activities that were projected are occurring, whether they are occurring in the expected locations, and how these findings relate to the projected effects of implementation. Monitoring and evaluation may occur in conjunction with analysis done at any scale in the step-down process. (See A Framework for Monitoring, Evaluation, and Adaptive Management, later in this appendix).

Concerns may arise about possible conflicts between resource needs and people’s needs. These are ultimately addressed at the local level, within the context of overall direction and priorities contained in the ROD. As a foundation, however, the Forest Service and BLM are obligated and committed to meeting the intent of existing laws, regulations, and policies. See previous section, Chapter 1, and Appendix 1 for further details.

## Implementation Process

Implementation of decisions made through this process will occur in two phases. First, activity planning and project design will begin almost immediately to reflect the management direction as described in the ROD. Generally, any ongoing, short-term activity that has been through the NEPA process would not be changed as a result of new direction. Short-term activities where analysis has been completed and decisions are pending will be screened to ensure there are no major conflicts with the new direction. Decisions affecting longer term permitted activities, such as livestock grazing and special-use activities, would have a transition period to come into compliance with new direction. The actual time frame and process to bring existing activities into compliance will be included in the Record of Decision. New projects will be designed to achieve the broad-scale objectives.

The second phase of implementation will occur over the longer term, whereby plans for individual administrative units will be reviewed for barriers to achieving broad-scale objectives. This should occur through the monitoring and evaluation process, which may lead to additional changes in plans through a later amendment or revision process that considers information specific to each administrative unit.

Implementation will require a transition phase that links local resource programs and restoration priorities (such as those developed for the existing Biological Opinions) with the long-term program of work and restoration priorities of this project. The specifics of this transition will be explained in implementation guidance. Linkages have already been considered and are reflected in the design of these broad scale objectives and priorities.



## Interagency and Intergovernmental Coordination, Collaboration, and Accountability

This EIS has been prepared with coordination and collaboration with other federal agencies; state, local, and tribal governments; Resource Advisory Councils (RACs); and Provincial Advisory Committees (PACs). Expectations are high for these decisions to resolve many broad-scale issues within the project area. In order to maximize the likelihood of fulfilling these expectations and to successfully restore the ecosystems of the project area, a collaborative approach toward implementing decisions made in the Record of Decision will be used. Currently there is no project-wide, systematic approach for interagency or intergovernmental coordination, collaboration, and accountability. Several areas have been identified where opportunities should be provided to meet this need. They include, but are not limited to:

- ♦ Consistent interpretation and application of decisions;
- ♦ Coordinating and conducting Subbasin Review;
- ♦ Prioritizing and conducting Ecosystem Analysis at the Watershed Scale;
- ♦ Assessing cumulative effects;
- ♦ Monitoring and adaptive management;
- ♦ Data management and inventory;
- ♦ Accountability and credibility;
- ♦ Coordination and collaboration with other federal agencies, state and local governments, and tribes.

After the Supplemental Draft EIS is published and before the ROD is released, representatives of the Forest Service, BLM, National Marine Fisheries Service, U. S. Fish and Wildlife Service, and U. S. Environmental Protection Agency will further develop and evaluate organizational options, process strategies, and training opportunities to address implementation of the ICBEMP direction. At this time, however, tentative decisions include a basin-wide coordination mechanism that consists of subregional, interagency, and intergovernmental coordination committees aligned along PAC/RAC boundaries.

## Consultation with Tribal Governments

Indian tribes and federal agencies want the tribes to have more involvement in the decision-making process as sovereign governments. Since late 1993, numerous executive orders, laws, and statutes (see Appendix 1) have required or encouraged this interaction.

Consultation is an active, affirmative process which (a) identifies issues and seeks input from appropriate American Indian governments, community groups, and individuals; and (b) considers their interests as a necessary and integral part of the BLM's and Forest Service's decision-making process. It can build strong working relationships and encourage exchange of local site-specific information, resulting in better decisions.

## Public Involvement and Collaboration

Federal agencies, social scientists, and others agree that ecosystem management requires increased participation by the public and other governmental agencies, including American Indian tribes, especially when those efforts foster mutual learning. Alternatives S2 and S3 reflect this, with objectives and standards designed to ensure that stakeholders play an increased role in public land planning, implementation, and monitoring.

An ongoing issue in public participation is how to involve not just the local and regional public, but also the national public. There appears to be consensus that it is most important to involve people who will be most directly affected by public land management. The economics chapter (Haynes and Horne 1997) of the *Assessment of Ecosystem Components* demonstrated the tremendous national values associated with project area resources; therefore, involving the national constituency should be part of the process, especially during processes such as regional priority setting.

It will be necessary to provide tribal, local, and state governments; other federal agencies; and the public with an opportunity to participate in technology transfer (conveying project science information). This will provide them (and agency employees) with a better



understanding of conditions, trends, issues, and interactions, which should enhance their increased role in planning, implementation, monitoring, evaluation, and adaptive management.

Collaborative approaches to implementation will be necessary to assure success. Close working relationships between management and regulatory agencies will need to be developed, maintained, and or improved. The BLM and Forest Service retain the responsibility and authority for land management decisions; however, these decisions will be more meaningful, effective, and long lasting if done in an open process through collaborative means. An important aspect of collaborative implementation will be forming subregional implementation teams for Resource Advisory Council (RAC) and Provincial Advisory Committee (PAC) areas, and using the knowledge and experience of the Councils and Committees.

## Linking Broad-scale Decisions and Information to Finer Levels

In the action alternatives (Alternatives S2 and S3), certain requirements provide a hierarchy of analysis to support land management decisions. The following section outlines the types and levels of analysis that will “step-down” broad-scale information and decisions to site-specific actions. This step-down process is designed to ensure broad-scale decisions are viewed within the context of local conditions, and that local decisions are made within the context of broad-scale goals and objectives.

While the EIS contains direction and context for addressing broad-scale issues and resource conditions, most management actions will require further analysis and additional decisions prior to being implemented. The primary value of the additional analysis is to provide the type and level of information needed to amend and revise land use plans, and to schedule and design site-specific management activities appropriately and effectively.

Specifically, this additional analysis is necessary to:

- ♦ Validate, refine, or add to information concerning current and historical resource conditions, processes, and interactions;

- ♦ Address issues not appropriately addressed at the broad scale;
- ♦ Prioritize restoration efforts to maximize the likelihood of meeting management goals and objectives, and to minimize negative impacts;
- ♦ Provide subregional and local input.

Analysis of ecosystems is a systematic way of gathering, organizing, and understanding ecosystem information. It is not, in itself, a decision-making process. Rather, it provides information necessary to make well-informed decisions as required by the National Environmental Policy Act (NEPA). With this information, managers can better understand and disclose the effects of their decisions, and identify monitoring and research needs. Ecosystem analysis also helps guide the type, location, and sequence of appropriate management activities within a watershed.

## Hierarchy of Analysis

The levels of analysis or review that are “below” (smaller-scale than) the project area-wide analysis conducted for this EIS are intended to provide the context necessary to appropriately implement these broad-level decisions on individual national forests and BLM resource areas or districts. In this project, these analysis levels are commonly referred to as “step down.” The step-down processes (Subbasin Review and Ecosystem Analysis at the Watershed Scale [EAWS]), as well as the differences between alternatives regarding the step-down process and results, are described in Chapter 3 of the EIS. This hierarchy of analysis or review is intended to meet the objectives mentioned above; however, additional scales may be more appropriate for certain subregional issues. Generally, watershed scale analyses will be aggregated to address issues that cross the boundaries of individual 5th- and 6th-field HUCs.

### Ecosystem Review at the Subbasin Scale (Subbasin Review)

The first step toward understanding how the *Scientific Assessment* relates to more localized conditions is Ecosystem Review at the Subbasin Scale (800,000- to 1,000,000-acre drainage area) (referred to in this EIS as Subbasin Review). This process is based on existing information. Subbasin Review will generally occur on



each 4th-field HUC across the project area. Exceptions include those subbasins where Forest Service- and BLM-administered lands make up only a small fraction of the total land area, or where grouping subbasins is logical. Subbasin Review will be conducted by an interagency, interdisciplinary team.

As stated in Chapter 3 of the Supplemental Draft EIS, the objectives of Subbasin Review are to:

- ♦ Assess resource status and condition, as well as risks and opportunities to reduce potential unwanted effects from management actions and land uses (for example, road-related adverse effects) and to better balance short- and long-term, and mid- and fine-scale risks;
- ♦ Provide an understanding of how the review area fits into the broad-scale ecosystem, gain an understanding of the ecosystem that is apparent only at the mid scale, and provide context and priority for finer scale analysis;
- ♦ Provide support for other analyses and initiatives such as EAWS, roads analysis, water quality restoration plans, the Healthy Rangelands Initiative, and further mid-scale assessment needs;
- ♦ Identify risks and opportunities to meet broad-scale and mid-scale objectives through subsequent site-specific management actions;
- ♦ Identify opportunities for pooling interagency (federal agencies) and intergovernmental (tribes, states, counties, cities) resources;
- ♦ Provide information and recommendations to support land use planning, consultation, and legal requirements, such as those found in the Federal Land Policy and Management Act, NFMA, treaty and trust responsibilities, Endangered Species Act, and Clean Water Act;
- ♦ Verify or provide mid-scale data where projected or unavailable from ICBEMP, and identify data gaps at the mid-scale; and
- ♦ Prioritize opportunities for: ecosystem restoration, filling social and economic needs, further analysis, monitoring and data collection, and other subsequent site-specific management actions.

Subbasin Review will provide an opportunity for interagency and intergovernmental involvement. The process for subbasin review is provided in the *Ecosystem Review at the Subbasin Scale (Subbasin Review): A Guide for Midscale Ecosystem Inquiry* (draft). While refinements of this draft guide are expected after the Supplemental Draft EIS is released and before the Final EIS is released, the guide describes a process that has been tested and will meet the purpose of the Subbasin Review as described above.

## **Ecosystem Analysis at the Watershed Scale**

The next analysis scale, below Subbasin Review, is watershed-scale analysis (5th- or 6th-field HUC; 10,000- to 100,000-acre drainage area) (referred to in this EIS as Ecosystem Analysis at the Watershed Scale [EAWS]). This analysis will normally use watershed and subwatershed boundaries; however, using other boundaries that are meaningful and efficient is appropriate as long as the logic and processes for EAWS are followed and the product provides context and information for decisions.

This scale of analysis is intended to:

- ♦ Establish a consistent watershed-wide context for water quality conditions and protection of beneficial uses;
- ♦ Provide the hydrologic characterization and identification of pollutant sources;
- ♦ Understand actual conditions at a resolution necessary to make judgement about watershed-scale effects of actions on resources;
- ♦ Evaluate potential actions in the context of an overall understanding of the capabilities, limitations, and risks of a specific watershed;
- ♦ Identify watershed level issues and concerns;
- ♦ Identify synergisms that can be gained through sequencing activities;
- ♦ Refine management standards to fit local conditions and values at risk;
- ♦ Identify monitoring needs for watershed-wide effects.

Ecosystem Analysis at the Watershed Scale will also provide an opportunity for interagency and intergovernmental involvement. It is an incremental process, whereby information from inventories, monitoring reports, or additional analyses can be added at any time. The EAWS process will follow the *Federal Guide for Watershed Analysis, Version 2.2*, or subsequent replacements, using the six-step process outlined in the *Federal Guide*.

Information derived through Subbasin Review and Ecosystem Analysis at the Watershed Scale would be aggregated up to assist in making programmatic decisions, such as land use plan amendments and revisions, and would be incorporated into site-specific decisions at lower levels.



## Site-specific Analysis

The next scale of analysis, below EAWS, is the site-specific, or activity-level analysis. This level of analysis will typically result in a NEPA process, including public scoping, and a site-specific decision document. While it may be feasible to analyze the effects of groups of activities at the watershed scale, most of the activities proposed will be analyzed at the site-specific scale. Under the hierarchy of analysis outlined above, this scale of analysis acts as a safety net for those issues overlooked or appropriately excluded at larger scales, and it provides site-specific information for determining effects.

Site-specific analysis has been used extensively since the inception of NEPA in 1969, and in accordance with Forest Service NEPA Handbook 1909.15 and BLM NEPA Handbook H-1790-1. It has been proven successful at identifying and addressing local issues and concerns; however, as a stand-alone assessment process, it has often been ineffective at addressing cumulative effects and larger scale issues. The site-specific analysis process will be significantly enhanced, predominantly by the context provided by higher scales of analysis when assessing cumulative effects. To the extent possible, projects will be “batched” for Endangered Species Act and tribal consultation at the watershed scale. The context provided by higher scales of analysis will also facilitate this endeavor, although it is not required. This process should further identify the monitoring necessary to meet those needs identified during Ecosystem Analysis at the Watershed Scale.

## Data Management and Technology Transfer

A key element for ecosystem management is the need for consistent, current, and accurate information concerning the ecological and biophysical environments across the landscape. The collection and management of data and information among tribal, federal, state, and local agencies need to be effectively coordinated and shared in order to implement ecosystem management and to successfully link broad-scale decisions and information to finer levels. Currently, data are collected in many formats among and within agencies. Developing a minimum data standard for vegetation, aquatic, fisheries, and terrestrial components of the landscape should be explored.

To facilitate implementation of the decisions for this EIS and the associated findings, technical support will continue after the Record of Decision is signed. This support could consist of:

- ♦ *Workshops*—Several types of workshops have been considered that could be useful in dissemination of the information gained during development of the ICBEMP. Technology transfer teams are crucial for providing user support and training to the field offices over the next several years.
- ♦ *A science advisory group* —Science advisory groups could interpret, consult, and provide advice on ICBEMP products, data, databases, and models.
- ♦ *A spatial analysis team* —A spatial analysis team could coordinate and maintain the Geographic Information System (GIS) database, and provide data layer maintenance for key layers.
- ♦ *Release, maintenance, and upkeep of the GIS database* —The GIS data (170 themes) and associated databases (approximately 20) collected and created for use in the *Scientific Assessment* needs to be managed, maintained, and shared.
- ♦ *Maintenance and updates of the various databases and models that were developed for the ICBEMP* —A central information clearinghouse could be established to support the update and implementation of national forest and BLM district land use plans. A few of the existing models have been fully documented and have user guides (Information Systems chapter [Gravenmier et al. 1997] of the *Assessment of Ecosystem Components*).
- ♦ *Technical assistance to support plan amendments* (Information Systems chapter [Gravenmier et al. 1997] of the *Assessment of Ecosystem Components*).



# A Framework for Monitoring, Evaluation, and Adaptive Management

## Introduction

This section of Appendix 10 provides a framework for developing a specific monitoring and evaluation plan to measure the conditions and trends in the ICBEMP project area. Information developed through the monitoring process can be used to assess management strategies, alter decisions, change implementation, or maintain current management direction. This section builds on *A Framework for Ecosystem Management in the Interior Columbia Basin* (Haynes et al. 1996) and the Supplemental Draft EIS.

Monitoring is the process of collecting information to determine if ecosystem management strategies are being implemented as planned, if management goals and objectives are being met, and if there are any unanticipated results from implementing planned management strategies. Based on an evaluation of the monitoring information, current management can be maintained or adjusted to meet ecosystem management goals.

Monitoring and evaluation play pivotal roles in the adaptive management process, primarily to detect undesirable changes early enough that management activities can be modified to work toward achieving the desired goals and objectives. Adaptive management strategies must include all four parts of the process: planning, implementation, monitoring, and evaluation. Resources must be allocated and priorities established so that all parts of adaptive management are completed over an appropriate time frame and no part is emphasized at the expense of another.

To be effective, monitoring and evaluation must be treated as an integral component of land management, be well conceived, and be adequately funded. Also, monitoring will necessitate a major cooperative effort involving interested and affected parties, including federal, state, and local governments; tribes; Resource Advisory Councils and Provincial Advisory Committees; local communities; private landowners; and special interest groups. These parties share a common

interest in attempting to achieve the objectives that emerged from the ICBEMP.

Ecosystems operate within a hierarchy, where each level of an ecosystem has discrete ecological functions but at the same time is part of the larger, integrated whole. Monitoring and evaluation also need to follow a hierarchical pattern – answering questions and measuring trends at the various levels within the project area. Certain issues and activities within the project area can have effects at the broadest level, such as activities that affect air quality, noxious weeds, or wide-ranging species. Other issues or conditions – such as forest health, juniper encroachment, and species endemism – operate within smaller geographic areas. Others are mostly of local concern, such as access management and municipal watersheds that may affect local communities. Monitoring strategies need to recognize such a hierarchy and provide for data collection and evaluation at the appropriate levels.

In summary, a coordinated, interagency, interdisciplinary monitoring system is needed to determine the health and integrity of the project area ecosystems, determine condition and trends, and provide the basis for needed changes in management. It is difficult and sometimes impossible to judge the health and integrity of the ecosystem at the regional level because of the wide variety of federal and non-federal monitoring activities currently existing in the project area, the dispersed nature of data, and inconsistency in the kinds of data collected. Data should be collected for the different ownerships within ecosystems so that it can be aggregated to answer broad-scale questions. Once regional data elements are identified for monitoring, appropriate monitoring systems can be designed to allow for analyses at various scales.

## Conceptual Framework of Monitoring

The conceptual framework contains four elements: goals, scope, general approach, and relationship of monitoring to other activities.

### Goals of Monitoring

Information provided through monitoring can be used to measure success in meeting plan goals. Specifically, monitoring efforts provide information to:

1. Determine if planned activities have been implemented and standards and guidelines are being followed;



2. Detect magnitude and duration of change in conditions and detect trends;
3. Formulate and test hypotheses as to the cause of the changes; and
4. Help managers better understand the causes of change and predict impacts.

Under this approach, departures from expected conditions or other quantities are treated not as failures but rather as new information to improve the quality of land management. Actions taken could be mitigation, change of actions in the future, and revised goals, or some mix of these. This iterative approach is referred to as adaptive management, described further in the Relationship of Monitoring to Other Activities section.

## Scope of Monitoring

The ICBEMP monitoring and evaluation strategy focuses on Forest Service- and BLM-administered lands in the project area (see Map 1-1 in Chapter 1 of this EIS). However, monitoring could cross administrative boundaries to measure other federal lands in the ecosystem. Monitoring needs to be a multi-agency effort characterized by sharing of information, adoption of data standards, and training among federal agencies and other interested parties is vital for success. Monitoring must be focused on decisions and directing contained in the Final EIS and ROD with the objectives of testing results and identifying necessary adjustment in order to achieve desired results.

The design of a monitoring program needs to accommodate a variety of geographic levels (for example, basin, subbasin, watershed), allowing information gathered locally to be compiled and interpreted or analyzed to answer broad regional questions. In addition, the program needs flexibility to allow for monitoring and evaluation at the regional level to better address broad-scale questions.

Because ecosystems are complexes of biotic, abiotic, and human elements interacting over time and space, the biological, physical, social, and economic aspects will need to be monitored to determine if ecosystem goals are being met. A complex array of landscapes, resources, management prescriptions, species requiring attention, and geographic areas must be addressed.

## General Approach of Monitoring Strategy

The following criteria will be considered when designing the monitoring strategy.

- ♦ Integrate the monitoring process into existing organizational structures as much as possible, rather than creating a separate organization to achieve monitoring needs.
- ♦ Be cost effective so that meaningful monitoring can be done within agency budgets;
- ♦ Support management objectives and address the identified issues and problems;
- ♦ Be sensitive to significant changes in ecological and social systems;
- ♦ Address the hierarchy of geographic scales (basin, subbasin, watershed);
- ♦ Provide early warning so appropriate actions can be taken in a timely manner;
- ♦ Provide a basis for natural resource policy decisions through analysis at various levels;
- ♦ Provide for integration of information among resource functions to support efficiency and ecologically based decision making;
- ♦ Integrate monitoring at the landscape level with monitoring at the subregional and regional levels;
- ♦ Emphasize sound experimental design and standardized data collection which will support statistical analysis where necessary;
- ♦ Integrate inventories into the monitoring system;
- ♦ Provide for corporate storage and systematic compilation, interpretation, and analysis of data;
- ♦ Be accessible across organizational levels and administrative boundaries;
- ♦ Be implementable within the existing agency structure;
- ♦ Ensure data are promptly analyzed and applied in adaptive management;
- ♦ Provide for distribution of results in a timely and effective manner.

The general approach is to measure variables that index whole ecosystems. Significant change in these variables indicates a need for further study. Initially,



this approach does not expect to directly identify cause-and-effect relationships; although they are needed, cause-and-effect relationships are left for follow-up investigations. Instead, the approach focuses on measuring change in the system which would indicate whether further study and evaluation are warranted.

An initial step in developing the monitoring strategy is to define the questions that need to be answered at the regional level to evaluate attainment of ecosystem management goals and objectives in the project area. These questions can be used to focus the monitoring strategy on appropriate issues and avoid gathering information which has limited value in answering pertinent regional level questions. The questions will also be used to help design a system that can be implemented within agency budgets.

Technical and scientific staffs, in consultation with field managers, need to play a key role in designing a monitoring strategy – to help select key monitoring elements and indicators that can be statistically sampled and can provide desired data at a reasonable cost, and to help develop and shape the monitoring questions.

The “reductionist” approach (that is, measuring all the insects, mammals, soil properties, water, etc.) should not be used. Given limitations on funding, the approach is not affordable, and the complexity could never be understood. Equally important, measurements of each of these ecological elements may not be necessary to address key, identified questions. However, individual species or other taxonomic groups (such as genera and families) or physical elements will be used if they are good indicators. Research will evaluate the effectiveness of alternative measures to improve future monitoring efforts.

A standard core set of data elements will be collected. Core data are the minimum set of variables to be collected at all scales. In all cases, standardized measurement and reporting protocols will be determined because of the need for consistency. Where possible, monitoring protocols will be designed to integrate existing monitoring efforts, and/or address multiple questions. Also, the design will allow flexibility for local administrative units to add data elements needed to answer subregional and landscape level questions.

The variables to be monitored will be indicators or surrogates representing other physical, biological, socio-economic, cultural, and/or ecological processes. They must describe conditions and trends for functional, healthy ecosystems and be quantifiable and

measurable in a repeatable way. A range of values for the variables may often be measured to account for the spatial and temporal variability found in a particular geographic area.

## **Relationship of Monitoring to Other Activities**

### **Relationship of Monitoring to Adaptive Management Process**

Some science publications indicate adaptive management involves large scale manipulative experiments designed specifically for learning. Learning better ways of doing things is an important purpose of this effort. However, this effort is much more than experimentation and learning, there are other needs and sideboards. For example, adopting this approach would require managers to accept more risk in application of some activities than is likely permitted by existing law, regulation, policy and procedure, or what collaboration with all involved parties would tolerate.

Therefore, in this context, adaptive management is defined as a continuing process of planning, implementation, monitoring, and evaluation to adjust management strategies to meet goals and objectives of ecosystem management. Monitoring has a vital role to play in adaptive management: to detect changes so that management activities can be modified to achieve management objectives.

Adaptive management emphasizes results, such as the achievement of desired functions, processes, and interrelationships of ecosystem components. Since knowledge often is incomplete when decisions are made, adjustments are made through time. A continual feedback loop based on new information allows for mid-course corrections to standards, guidelines, and underlying assumptions (at time intervals appropriate to the systems, processes, and functions analyzed), in order to meet the planned goals and objectives. It also provides a model for adjusting goals and objectives as new information develops through monitoring or other means and as public desires change.

### **Relationship of Monitoring to Research**

Research participation in the development of monitoring protocols is essential to the success of the adaptive management process described above. Data obtained through monitoring activities in a systematic and statistically valid manner can be used by scientists to develop research hypotheses related to priority issues. Conversely, the results obtained



through research can be used to further refine the protocols and strategies used to monitor and evaluate the effectiveness of activities occurring in the implementation of ecosystem management.

The step down process is a process to characterize human and ecological features, conditions, processes, and interactions within a geographic area. The activities are intended to help estimate direct, indirect, and cumulative effects of management activities and guide the general type, location and sequence of appropriate management activities within a geographic area. This tiered process is an important part of adaptive management that will “localize” monitoring efforts.

Reliance on achieving desired outcomes through application of the step down process requires the assurance of an adequate monitoring, evaluation, and accountability system. A monitoring strategy will focus on the key issues and objectives at hand, link monitoring responsibilities at different organizational levels, and focus on the achievement of objectives and time frames outlined in the alternatives. Through this process, local BLM and Forest Service managers will be held accountable to ensure that on-the-ground decisions and activities maintain overall integrity of ecosystems at the landscape level and are linked to broader-level desired outcomes.

Generally, Subbasin Review and EAWS are based on existing data; however, it should also incorporate monitoring and evaluation information. Ecosystem analysis information should additionally be considered in developing future monitoring plans. Information derived from ecosystem analysis is used to: guide management prescriptions, including the setting and refining of boundaries in riparian areas; set restoration strategies and priorities; and reveal the useful indicators for monitoring environmental change.

## **Relationship of Monitoring to Inventories and Surveys**

Inventories and surveys are parts of the adaptive management framework and need to be closely linked with monitoring. Information gathered in the inventory and survey process form a baseline from which trends in ecosystem conditions can be measured. Virtually all the concerns identified in this framework must be considered in the design of a sound inventory system.

## **Relationship of Monitoring to Evaluation**

Evaluation is a process in which the plan and monitoring data are reviewed to see if the management goals and objectives are being met and if management direction is sound. This portion of the adaptive

approach examines the monitoring data gathered over time and uses it to draw conclusions on whether management actions are meeting stated objectives and, if not, why. The conclusions are used to make recommendations on whether to continue current management or what changes need to be made in management practices to meet objectives. The results could be changes in mitigating measures, future actions, monitoring elements, objectives, standards, guidelines, or some mixture of these.

# **Monitoring Components**

This framework provides a starting point for building a monitoring program based on identifying the fundamental kinds of information that must be gathered to evaluate the success of ecosystem management. The next section of this document focuses on the types of monitoring and on the development of interagency and intergovernmental monitoring. A five-step process for establishing a monitoring network is discussed.

## **Types of Monitoring**

Four types of monitoring (implementation, effectiveness, validation, and baseline) will be applied to meet management objectives and to evaluate management practices used in implementing local plans. These four types of monitoring encompass the broad spectrum of monitoring, and all of them need to occur to achieve the goals of the adaptive management process. Some agencies may use different terms for the same types of monitoring.

## **Implementation Monitoring**

Implementation monitoring is the most basic type of monitoring and simply determines whether planned activities have been implemented and whether the standards and objectives were followed. Some agencies call this *compliance monitoring*.

## **Effectiveness Monitoring**

Effectiveness monitoring is aimed at determining if the implementation of activities has achieved the desired goals and objectives, and whether the standards and objectives have attained the goals and objectives of ecosystem management. Success may be measured against the benchmark of desired future condition. Cause-and-effect relationships will ultimately need to be understood to ensure that management actions result in desired conditions.



## Validation Monitoring

Validation monitoring is intended to ascertain whether a cause-and-effect relationship exists among management activities or resources being managed. It confirms whether the predicted results occurred and if assumptions and models used in developing the plan are correct. While recognized for being demanding and expensive, validation monitoring is equally as important as implementation, effectiveness, and baseline monitoring.

## Baseline Monitoring

Baseline monitoring is used to establish reference conditions by monitoring elements or processes that may be affected by management activities. Generally, the reference conditions are natural or relatively unaffected by human activities.

## Developing Interagency and Intergovernmental Monitoring

Development and implementation of monitoring to collect, report, and evaluate data in a manner that is both scientifically credible and economically feasible requires careful design and coordination. As previous sections have discussed, foremost needs are:

- ♦ To develop and implement a common design framework and common indicators or environmental measurements, tiered to the final EIS and ROD;
- ♦ To identify specific indicators within each monitoring component or activity, along with protocols and methods for their measurement and quality assurance; and
- ♦ To establish a required level of detection ability, data quality objectives, and precision.

The monitoring framework that is established should: (1) be cost effective; (2) permit data to be integrated through statistical or modeling approaches to provide quantitative inputs to the adaptive management process; and (3) accommodate multiple geographical scales and provide a consistent process for establishing monitoring sites, frequency of sampling, level of sampling, and specific techniques for analysis, synthesis, and reporting. This approach is critical to ensuring consistent collection, integration, and evaluation of monitoring over long time periods among projects, watersheds, regions, and agencies.

Following is a five-step process for establishing a monitoring network:

- Step 1. Establish linkages between and among agencies, tribes, advisory groups, and others.
- Step 2. Identify information needs.
- Step 3. Survey and evaluate ongoing monitoring efforts.
- Step 4. Establish technical details.
- Step 5. Establish a repository system for collected data, storage, and analysis.

### Step 1. Establish Linkages Between and Among Agencies and Tribes

In order to accomplish necessary linkages among agencies, tribes, and research, an interagency monitoring team needs to be formed under direction of the Regional Executives, with the goal of integrating a project monitoring process into the existing agency organization. This team would be responsible for assuring key decisions and directions in the Final EIS and ROD are sufficiently monitored to assure consistency of implementation and identify if any modifications in implementation are needed to achieve desired outcomes. They would also be responsible for assuring that data storage and data management are occurring so the information upon which the ICBEMP is based is maintained and changed to reflect new information and changing conditions. Leadership and structure of the team is yet to be determined, but to assure adequate representation, all agencies, research and tribes must be vested within the group, and funding and priority given the membership to allow them to be active participants.

In addition, private citizens and groups will be encouraged to participate in monitoring. This participation will be coordinated by individual agencies, as determined by the monitoring items, type and scale of monitoring, and agency responsibility. At the subregional or regional scales, Resource Advisory Councils (RACs), Provincial Advisory Committees (PACs), coalitions of counties, or other bodies may also participate in monitoring through methods developed by the committee.



## Step 2. Identify Information Needs

A monitoring strategy will concurrently be developed with the Final EIS and Record of Decision, to give focus to the monitoring task and to assure a direct link to the decisions. For example, there is a strong likelihood that terrestrial species habitats and populations will be an element of the decision. A strategy will be developed to monitor specific questions associated with this element, such as how source habitat, snags, roads, population outcomes, terrestrial species viability and long-term recovery and delisting of wide-ranging threatened or endangered species are affected over time with implementation of ICBEMP direction.

## Step 3. Survey the Ongoing Monitoring Efforts

Step 3 consists of conducting an initial survey of the monitoring activities currently used by other agencies or groups within the project area, to evaluate similar monitoring objectives and identify information gaps and barriers. Monitoring activities identified through this process will be potential candidates for incorporation into the interagency monitoring framework.

Information requests can be designed and distributed to all the potential agency staff and other parties who collect relevant environmental data. The most efficient approach would be to have an initial survey to identify the relevant activities, followed by collection of in-depth information on the appropriate ones. These surveys should include the individual monitoring program, objectives, questions, ecological resources, indicators and associated protocols, design, quality assurance information, costs, and historical data.

After collecting information about existing monitoring activities, a detailed review and comparison of information needs and existing monitoring should be conducted. Results can be summarized in a report containing the following general categories:

- ♦ Program scope, objectives, and temporal and spatial resolution;
- ♦ Program methods and design;
- ♦ Program documentation and reporting;
- ♦ Program organization and coordination;
- ♦ Program barriers, effectiveness, and weaknesses.

## Step 4. Establish Technical Details

Step 4 in the monitoring design process involves several elements: information or data quality objectives, indicators, statistical design, measurement and sampling protocols, and a quality assurance program.

Indicators and protocols that currently exist (as identified in Step 3) need to be evaluated to determine their adequacy in meeting the objectives. Where possible, this evaluation should be based on whether or not the data is relevant to specific direction and decision for the Final EIS and ROD. The intent is to deliberately maintain the link of post ROD activities to the direction and decisions contained therein to assure an efficient adaptive management process.

Although the general concepts of monitoring are broadly understood, application of the natural resource monitoring protocols necessary to carry out the ICBEMP monitoring recommendations is complicated. For example, there are many legal mandates for monitoring individual species across biologically complex areas. These mandates – coupled with considerations for management of habitats, plant communities, and ecosystems over a variety of spatial and temporal scales – require monitoring systems and approaches that may test and exceed the existing theory and technology for monitoring.

Adequate indicators and protocols need to be developed in those cases where they do not exist. Development of appropriate protocols will require coordination with the research components within the overall effort. If research results indicate that specific methods are successful, a pilot study should then be planned to field-test the methods and evaluate the results. After evaluation of the pilot study, any necessary changes can be made in the protocols. If the protocol is determined to be suitable, then the type and level of training necessary for field staff to implement the methods should be determined.

As technical monitoring groups provide strategies to address evaluation questions, gaps and barriers may be found in existing research and monitoring technology. Research priorities must be to fill in these gaps.



Some of the issues related to sufficiency of monitoring technology that may be considered in developing a comprehensive monitoring strategy are:

- ♦ Efficiency;
- ♦ Simplicity;
- ♦ Sensitivity of monitoring measures relative to natural ranges of variation;
- ♦ Indicator development and testing;
- ♦ Development of new technology and adaptation of existing technology;
- ♦ Changes needed to current laws and regulations to enable more effective monitoring operations, data collection and analysis;
- ♦ Development and effective transfer of sampling approaches, monitoring protocols and ideas on application where these elements do not exist;
- ♦ Adequate monetary support;
- ♦ Linkage to existing organizational structures.

### **Step 5. Repository for Data and Analysis**

The ICBEMP has created a large database that is expected to be used as baseline information in the evaluation process. That data could be stored at the Oregon/Washington BLM State Office and Forest Service Pacific Northwest Regional Office, both located in Portland, Oregon. The data could be made available via an Internet site. Each agency's information resource management staff, in coordination with monitoring coordinators, could be responsible for the administration of their agency's portion of the data.

Management of data and analysis must consider the need to collect and store new regional level monitoring data. The comparability of data collected by all agencies is a crucial issue to be resolved by the committee. The protocol must be clear about how each agency's data contribute to the whole data set needed for evaluation of ecosystems at the regional level. Each agency would collect and maintain monitoring data according to the protocol developed by the team overseeing this effort and make it available upon request to other agencies for use in evaluation of ecosystem management. The monitoring coordinators and information resource management group would collect appropriate data from agency records, construct databases, and manage the information for analysis or formal evaluation.

## **Evaluation Component**

Evaluation is the next key component of the adaptive management process. It is the process by which a comprehensive, holistic review of the plan and monitoring data is developed. If the planning is completed, the plan is implemented, and monitoring data are gathered without the follow-up to judge the success of the plan, a high likelihood exists that problems will not be detected until a crisis develops. This portion of the adaptive management approach focuses evaluation on actions and outcomes, where departures from expected conditions or results are treated not as failures but rather as new information to improve the quality of management. The results could be changes in mitigating measures, future actions, objectives, standards, guidelines, or some mixture of these.

The evaluation process is used to determine whether or not ecosystem management objectives and standards in the project area are being met and remain appropriate. The process gathers together all the data available from the monitoring process and uses the data to answer these questions:

- ♦ Were the standards followed?
- ♦ Were the goals and objectives met?
- ♦ Were the standards effective at meeting the goals and objectives?
- ♦ Were the underlying management assumptions correct?
- ♦ Have public expectations for ecosystem management changed?
- ♦ Are the decisions still appropriate?

The public has an important role in evaluation — to help ensure that the evaluation process addresses public concerns about agency ability to implement adaptive management.

The final stage of evaluation is to develop recommendations for changing current management, if needed, to meet ecosystem management goals. Adjustments should be related to implementation of management plans, management plan objectives, standards and guidelines, and monitoring data collection and integration. Recommendations should be used to modify land use plans, thus completing the adaptive management circle.



Since knowledge may be incomplete when decisions are made, adjustments need to be made through time; a continual feedback loop based on new information allows for mid-course corrections at time intervals appropriate to the systems, processes, and functions analyzed. An evaluation schedule needs to be set in advance to ensure that: (1) evaluations are conducted at intervals that allow for corrections in management direction before crises develop; (2) monitoring data are gathered in advance to be used in the evaluation process; and (3) the appropriate evaluation team is assembled to conduct the evaluation.

Regional-level changes in ecosystems occur slowly over time. Management evaluations made too frequently will not detect changes in the ecosystem because cost-effective monitoring systems cannot detect them. On the other hand, if ecosystem management evaluations are not conducted, or if they are delayed for too long, irreversible changes may take place without detection. To avoid this problem, two periodic management evaluations are proposed. The first is an implementation evaluation to be conducted every five years, beginning five years after completing the ICBEMP ROD, to see if the plans resulting from the project were implemented. The second is an effectiveness evaluation, to be conducted 10 years after completion of the ROD, to see if management practices are leading to achievement of ecosystem management goals and objectives.

The five-year implementation evaluation could be conducted by staff at national forests and BLM districts. Monitoring data would be evaluated and changes made to local actions where necessary to meet goals, objectives, and standards of ecosystem management plans. National forests and BLM districts within Resource Advisory Council or Provincial Advisory Committee boundaries should coordinate their evaluations and involve the Resource Advisory Council or Provincial Advisory Committee (or other public advisory groups) in the evaluation process. This coordination ensures that project area ecosystem management implementation issues are considered at the broader level while incorporating public participation. The general public and American Indian tribes also need to be involved in the evaluation.

A 10-year project area ecosystem management effectiveness evaluation could be conducted by an interagency evaluation team formed by the regional executives. The team would evaluate ecosystem management plans and monitoring information with involvement of the public. They would develop findings and recommendations to the participating agencies on: (1) whether or not the management was effective in meeting goals and objectives; (2) whether or not the assumptions and models used in developing the plan were correct and

are still valid or need to be changed; and (3) what changes are needed in mitigation measures, future actions, objectives, standards, and guidelines to meet ecosystem management goals.

## Funding

Most of the funds and personnel necessary to conduct monitoring, data management, and evaluation activities for the implementation of ecosystem management in the project area are expected to come from the federal land management agencies. However, the expertise needed to develop and refine scientifically credible monitoring approaches is expected to reside with individuals who are often located elsewhere (such as Forest Service experiment stations, National Biological Survey, state agencies, university researchers, and tribes).

Traditionally, funds have been allocated for the planning and implementation phases of the adaptive management process, while monitoring and evaluation have been given minimal attention. There is a need to allocate resources and establish priorities so that all parts of adaptive management are completed over an appropriate time frame and so that no individual part receives emphasis at the expense of another.

Costs relative to monitoring are associated with the agency monitoring coordinators, the interagency monitoring committee, information gathering, and data management. The regional executives would set priorities; the committee would develop the protocols; and the agencies would implement them. Because funds for ecosystem management are limited, monitoring and evaluation activities have to be carefully planned so that only critical information needed for evaluation is gathered.

## Challenges to Implementation

Because of the diversity of resources, conditions, communities, and concerns throughout the project area, challenges to successful implementation are expected to arise. This section summarizes some of these that have been compiled from an informal survey of BLM, Forest Service, and other agency employees; from challenges discussed in interdisciplinary and public meetings; from public and other comments



received during the course of the project; and from an ICBEMP science contract report concerning barriers to ecosystem management.

## Funding

Funding to accomplish the Record of Decision will be a challenge and will require new approaches. Congressional allocation will largely dictate amounts and emphasis. This decision does not mandate specific levels or allocations of funds. However, it is envisioned that the ROD will have an effect on the distribution and emphasis of agency out-year program requests and agency funding allocations. With the boundary-less nature of the decisions, the involved agencies at the National Forest and BLM district level will need to jointly establish local priorities and funding strategies through the step-down-process. This contrasts with the traditional processes where, generally, each agency independently established their priorities to treat land within their responsibility. A similar philosophy must apply at the state and regional as well as basin level. The manner in which available funds are allocated across the project area and among possible treatments affects the degree to which the achieved outcomes reflect the outcomes projected in the SDEIS Chapter 4. Implementation of the preferred alternative presumes funds are expended to focus on the restoration work that has been identified as a priority, through management direction, such as directed through specific management objective, or designation (such as in an A2 subwatershed). In addition, the basin-wide prioritization of "high priority to restore" subbasins should be used to guide allocation of resources if the outcomes identified for the preferred alternative are to be achieved.

In summary, to implement the ROD, the executives and their staffs will collaboratively set priorities for funding requests and allocations at the regional and subregional scales using the guidance set by the ROD as a template to bring about a basin-wide strategy that addresses broad-scale issues. This contrasts with traditional approaches.

Funding reductions sometime result in organizational restructuring which can present additional challenges in retaining the appropriate staff for implementing an integrated program. In addition, many employees move frequently within their careers. On the one hand, this creates new ideas and innovation; on the other hand, local relationships are interrupted, and local knowledge of how ecosystems respond to treatments often is lost.

## Monitoring

Monitoring has been a challenge in the past. Often there has been more emphasis and energy in putting forth new projects than in conducting monitoring and evaluation activities. The ICBEMP action alternatives have objectives and standards that address ways of approaching monitoring to meet this concern and tie monitoring to decisions made during implementation. This will require that agencies reexamine how projects are funded and the rate of implementation, as monitoring will become an essential part of implementation.

Concerns have arisen about the effectiveness of restoration activities, which address most of the components of ecosystems, including vegetation, disturbance, aquatic/riparian resources, and human needs associated with Forest Service and BLM management. With the tremendous variety and diversity of conditions within the project area, it is not realistic to think that activities appropriate in one area will necessarily work in others. This EIS outlines restoration expectations at the broad scale and recognizes that implementation will occur at the fine scale or local level. Since successful implementation of the selected alternative will depend on how effectively implementation activities are conducted, the BLM and Forest Service expect to review restoration actions and programs through the monitoring and evaluation process, and to work within existing authorities to apply appropriate adaptive management techniques to respond appropriately.

The agencies also recognize that the amount of time required to see effective results can vary. For example, replacing a culvert that impedes fish migration can show immediate results; determining trends on rangelands, or altering patterns and structure of forest landscapes, may take decades to evaluate the effectiveness of change. Both long-term and short-term monitoring strategies are necessary to meet this monitoring challenge. Collaborative approaches with tribes, other agencies, Resource Advisory Councils, Provincial Advisory Committees, the public, and other governments also will be necessary.

## Existing Laws

The BLM and Forest Service are authorized and bound by many existing laws and treaties (see Appendix 1 in this EIS), many of which have been developed to respond to issues of the time. Sometimes these laws have competing requirements. Often agency staffs spend considerable energy in assuring that the intent



of existing laws, regulations, and policies are met. Many of these are simple and straightforward; others are more complex. For example, under existing mineral leasing laws, agencies retain ultimate discretion whether or not to lease or which stipulations to attach (such as no surface occupancy) for leasable mineral resources such as oil, gas, geothermal and coal. Agencies can decide whether or not to sell common mineral resources such as gravel. However, locatable minerals (such as gold and other metallic metals) are different because of the 1872 Mining Act, and agencies work with operators through notices and plans of operation to minimize adverse effects. Complying with both the Mining Act and the Endangered Species Act while also meeting the intent of aquatic conservation strategies is an example of the complexity of legal challenges to successful implementation.

## Understanding Ecosystem Management

The challenge most frequently cited by respondents to the study prepared by Schlager and Friemund (1994) was the confusion surrounding the meaning of ecosystem management. Multiple definitions and interpretations have the potential to describe ecosystem management so broadly that the concept becomes meaningless to some. The ambiguity causes many members of the public to be suspicious, and it can create unclear expectations by both the public and agency employees. Ecosystem management needs to be well defined, with associated clear goals and expectations, to achieve successful implementation. The intent of this project and EIS is to explain the concepts of ecosystem management and how these concepts would apply to management activities and expected outcomes on lands administered by the BLM or Forest Service. By doing this and by refining this implementation plan, many of the ambiguities about the term ecosystem management can be better addressed.

A related challenge is a perception that ecosystem management is an internal agency policy shift that is not specifically based on new legislative direction, even though ecosystem management is being implemented by the Forest Service and BLM in response to existing laws, changing public values, and new information and understandings. This challenge can be addressed in part by public involvement and clear documentation of the numerous agency-level directives, interim management direction, laws related to land and resource management, and court orders that collectively provide legal and regulatory authority for permanent, long-term, ecosystem-based management direction.

## Agency Accountability and Credibility

Through the course of the ICBEMP, it has become clear that there is mistrust in the ability of the Forest Service and BLM to do what is specified in plans, policies, and programs. This mistrust results in frustrations on the part of some who rely on goods and services expected from these public lands. In addition, frustrations occur from those concerned about agency abilities to provide protection to such resources as threatened and endangered species or species of concern to tribes. Others are unclear about expectations and how programs will be implemented.

The challenge of addressing such concerns is two-fold: (1) some events or processes such as appropriations, or the results of litigation are outside the control or the authorities of the agencies; and (2) priorities may not be clearly communicated, accountability may not be clearly assessed, or organizational challenges may inhibit progress toward meeting goals. The latter are within the control of the agencies.

Through discussions with many of the people associated with the project both internally and externally, there is a clearly expressed need to assure agency priorities and direction are clear and staffs are accountable for meeting these needs. This may be further addressed by the desire of many to expand the role of tribes, the public, and other agencies and governments in participating in agency planning, implementation, and monitoring activities such that problems are identified early and adjustments are made as necessary.

## Tribal Concerns

Federally recognized tribes have critical interests and/or rights associated with significant portions of land administered by the BLM or Forest Service. Some of these American Indian tribes retain rights which were reserved under treaties and other agreements negotiated with the U. S. government. Tribal rights and interests in the management of resources sometimes conflict with the interests of other groups and cultures.

Certain specific issues with respect to the ICBEMP project are of deep concern to American Indian tribes. These concerns are described in more detail in Chapters 1 and 2 and Appendix 8 of this EIS. They include:

- Differing perceptions regarding the trust obligations of the federal government with regard to off-reservation settings;



- ♦ Tribal consultation requirements and opportunities to participate in the decision making;
- ♦ Tribal community health and well-being;
- ♦ Availability of culturally significant species and access to socially and/or traditionally important habitats;
- ♦ Adequate restoration of all damaged habitats and protection of high quality habitats for native species of interest to tribes;
- ♦ Protection of the integrity of cultural places such as landscapes, traditional use areas, burial sites, archeological sites, and other areas of tribal interest;
- ♦ Maintenance of harvestable populations of salmonids and other fish, wildlife, and plant species important to the tribes; and
- ♦ Active protection of cultural resources and cultural practices, including the rehabilitation of gathering sites, restoration of native plant communities, and restoration of watershed health and function.

In many areas, there is mistrust and misunderstanding between tribes and the agencies. In some units, there is a lack of understanding or awareness of tribal interests in federal land management as a result of treaties, executive orders, or other agency policies. Because the U.S. courts have not clearly defined the precise scope of the federal-Indian trust relationship, agencies often are unsure when a responsibility is met or redeemed. These misunderstandings can create adversarial relationships rather than partnerships.

Government-to-government consultation is an ongoing relationship between an agency (or agencies) and a tribe (or tribes). Consultation has been variably defined and implemented, and among tribes there are as many definitions for consultation and fulfillment of trust as there are Indian nations. For that reason, consultation is conducted with each tribe individually. Consultation and collaboration are necessary and must be substantive, and the involvement and participation by affected tribes take time, people, and money for both tribes and agencies.

Currently, agency-tribal relations infrequently incorporate a formal consultation strategy. Consequently, agency-tribal relations often are not addressed in a context that would enable adaptive responses to agency operations and tribal rights and concerns. Collaborative processes to establish agreeable consultation procedures and concerted efforts to provide shared understanding of agency missions and tribal rights and concerns are needed to meet this challenge.

## Perceived Threat to Private Interests

Ecosystem management conjures fears in some people of increased direct or indirect governmental regulation or control of private landowner management practices or rights. Many rural communities within the project area are undergoing challenges or changes to their local economies; many people in these communities are understandably anxious about the future. Although the Forest Service and BLM have no authority, intent, or desire to make decisions or implement programs outside agency boundaries, the challenge remains to address this continuing concern and to acknowledge that programs administered by the Forest Service and BLM can have effects on local communities, especially in more rural areas.

## Ability to Implement Adaptive Management

Although there is widespread support for adaptive management as a principle and a process, sometimes agency operating regulations pose challenges. For instance, if through monitoring and evaluation a need is identified to alter a local land use plan standard or change a management allocation, a plan amendment often is needed. Depending on the significance of the amendment, the actual process may take substantial time and be subject to rigorous planning steps. Sometimes the process discourages agencies faced with declining budgets and staffs to accomplish the needed changes.

## Collaboration and Associated Challenges

Collaboration to address complex land management issues at the levels directed by the ROD will be difficult. Issues will include differing definitions of collaborations. For example, some will state that they didn't get a chance to collaborate if their issue isn't dealt with totally the way they wanted. Others will refuse to come to the collaborative table, hoping that in doing so they may be able to keep action they don't want from occurring. And, collaboration takes time and funding that may not be available.

The preferred alternative addresses the intent of collaboration, which is that collaboration must be demonstrated as a good faith element of implementa-

tion. However, it is recognized that action to implement the ROD must not be halted if the appropriate parties can't all coalesce in a unanimous group to agree upon a particular facet of implementation, or if some party chooses to not come to the table and become involved in the collaborative process.

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# Appendix 11

## Integrated Weed Management

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# Introduction

The magnitude and complexity of noxious weeds in the project area, combined with their cost of control, necessitates using Integrated Weed Management (IWM). This involves the use of several control techniques in a well-planned, coordinated, and organized program to reduce the impacts of weeds on public lands. Where noxious weeds do not currently exist, the cheapest, most effective, and highest-priority IWM technique is prevention. Prevention, public education, detection, and quick control of new/small infestations are very effective and economical as the first steps for implementing IWM. "These strategies are urgently needed to protect the vast majority of western federal lands that are not yet seriously infested with exotic plants." (Partners Against Weeds, January 1996) Along with effective noxious weed control, proper management must be adopted as part of the IWM program. The IWM program must fit into an overall land or activity management plan.

## Integrated Weed Management

### Goal 1. Education and Awareness

Knowledge of what noxious weeds are and what they can do to the land will help the public and land managers understand why long-term noxious weed control is so important. The public and land managers must recognize the impacts of noxious weeds to the diversity of native plant and animal species and the economic impacts to those who use the land for ranching, farming, hunting, camping, bird watching, and other activities. Recognizing how and where noxious weeds are spread is critical. Weeds can be spread by livestock, pack animals, wildlife, motor vehicles, seed mixtures, hay, wind, water, people walking through infested areas, and countless other ways. Emphasis must be placed on developing outreach programs, training opportunities, cooperative education and awareness programs, university courses, and other opportunities to inform and educate the public and land managers. Once standard weed prevention measures are a part of the

public's and land manager's normal activities, then the spread of noxious weeds by human actions will cease to be one of the major issues in noxious weed management.

### Goal 2. Prevention of Weed Spread

Preventing the introduction of rangeland weeds is the most practical and cost-effective method for their management. Prevention programs include such techniques as limiting weed seed dispersal, minimizing soil disturbance, and properly managing desirable vegetation. New weed introductions can be minimized by (1) using weed seed free hay, feed grain, straw, or mulch, (2) refraining from driving vehicles and machinery through weed infestations and, before driving from a weed infested area to an uninfested area, washing the undercarriage of vehicles and machinery, (3) permitting livestock to graze weed infested areas only when weeds are not flowering or producing seeds, or, if livestock are grazing weed infested areas, moving them to a holding area for about 14 days before moving them to weed-free areas, (4) requesting that campers, hikers, and sportsmen who are recreating in weed infested areas, brush and clean themselves and their equipment before moving to uninfested areas, (5) minimizing unnecessary soil disturbance by vehicles, machinery, waterflow, and livestock, and (6) managing grasses for vigor and competition with weeds.

### Goal 3. Detection, Inventory, and Mapping

Early detection is crucial to IWM. Weeds encroach typically by establishing small "satellite" infestations, which are generally the spreading front of the large infestation. It's imperative that these small infestations are discovered prior to their development of larger infestations so that eradication is successful. The goal of inventory and mapping is to determine and record the weed species present, the area infested, the density of the infestation, the land under threat of invasion, the soil and vegetation types, and other site factors pertinent to successfully managing infested lands and lands susceptible to invasion. Inventories and mapping can be conducted by field surveys, aerial photography, and geographic information systems.



## Goal 4. Planning

Planning is the process by which weed problems and solutions are identified and prioritized. In addition, an economic plan of action is developed to provide direction for implementing the IWM program. Implementing control techniques includes: (1) preventing encroachment into uninfested rangeland; (2) detecting and eradicating new introductions; (3) containing large-scale infestations; (4) controlling large-scale infestations using an integrated approach; and often (5) revegetation. The key component of any successful weed management program is sustained effort, constant evaluation, and the adoption of improved strategies.

## Goal 5. Integrated Methods of Weed Control

Integrated Weed Management is based on the fact that combining several methods of weed control has greater likelihood of being effective than using a single method only. It involves four general categories of management options which are, cultural, biological, physical, and chemical control. Cultural control methods are management related programs such as prevention, livestock grazing, wildlife management, soil disturbing activities, and public use. Physical control methods include "grubbing", hand pulling, mowing, plowing, and burning. Biological control methods include introducing insects that feed on reproductive portions of the noxious weed, or grazing livestock, such as sheep, on leafy spurge. Chemical control methods includes herbicides and fertilization to increase competitiveness of beneficial plants and pesticides. Therefore, IWM requires that you determine which control measures or combinations thereof will best reduce or eradicate the noxious weed(s) you are targeting.

Priorities for control measures are as follows:

- 1. Eradicating New Introductions** - Eradication involves total removal of the weed and is achievable on a small scale. An eradication program involves delineating the boundaries of the infestation, both on the ground and on maps, determining the proper control procedures, and the number and timing of follow-up applications. This generally requires aggressive annual applications of herbicides. Revegetation of infested areas might be required to eradicate weeds in areas that do not have an understory of desirable species

that can reoccupy the area after weeds are controlled. Eradication of small patches requires continual monitoring and evaluation to ensure successful removal of the weed.

- 2. Containing Large-scale Infestations** - Containment programs are generally used to restrict the encroachment of large-scale weed infestations. Studies have shown that containing weed infestations, which are too large to eradicate, is cost-effective because it preserves neighboring uninfested rangeland and enhances the success of future large-scale control programs. Containing a large-scale infestation requires using preventive techniques and spraying herbicides on the border of weed infestations to stop the advancing front of weed encroachment. Containment programs typically require a long-term commitment to herbicide application because they are designed to limit spread and are not designed to modify or reduce the infestation level. Roadways and railways, where weed infestations often begin, should be subjected to a constant prevention and containment program.

- 3. Controlling Large-scale Infestations** - Most successful large-scale weed control programs are completed in a series of steps. Weed control areas should be divided into smaller units to make them more manageable. Weed control should be implemented unit by unit at a rate compatible with economic objectives.

Initially, large-scale weed control should focus on rangeland sites with an understory of residual grasses and the highest potential productivity. Suppressed grasses have the greatest chance of reestablishing dominance on these sites. These areas must be spot treated each year to ensure control and minimize reinvasion. In most cases, some percentage of the management unit will require that control measures be repeatedly applied until the weed seed bank and root reserves are exhausted.

Next, control efforts should focus on the sites adjacent to those initially treated to minimize reintroduction of the weeds. Usually, large-scale control is most effectively applied from the outside of the weed management unit inward toward its center. Selection and application of weed control techniques in large-scale control programs depends on the specific circumstances for each portion of the management unit. Control techniques used in one area of the management unit might be inappropriate for another area. For example, sheep grazing leafy spurge in one area might provide cost-effective control, but sheep do not readily consume spotted knapweed



and herbicides might be more appropriate. Similarly, the most effective herbicide for a particular weed species might not be labeled for use in an environmentally sensitive area. Selection will depend on the (1) weed species, (2) effectiveness of the control technique, (3) availability of control agents or grazing animals, (4) land use, (5) length of time required for control, (6) environmental considerations, and (7) relative cost of the control techniques.

Researchers are currently determining if combining treatments will provide a synergistic (the effects of the treatment combination are greater than the sum effects of each treatment applied individually) response in controlling weeds.

Some preliminary evidence suggests most control techniques are compatible. The later discussions of each weed species in this report include recommendations for treatment combinations that might be effective.

4. **Revegetation** - Revegetation with desirable plants might be the best long-term alternative for controlling weeds on sites without an understory of desirable species. Establishing competitive grasses can minimize the invasion of rangeland weeds and provide excellent forage production. In most areas, a fall herbicide application after weeds have emerged with subsequent plowing or disking and drill seeding is most effective for establishing desirable species.
5. **Proper Range Management** - Proper range management is especially critical during the management phase after weed control. Proper livestock grazing is essential to maintain competitive desirable plants, which will help prevent weed reinvasion after control. A grazing plan should be developed for any management unit involved in a weed management program. The plan should include altering the season of use and stocking rates to achieve moderate utilization of the herbaceous component. Grazing systems should rotate livestock to permit plants to recover before being regrazed and should promote litter accumulation. Range monitoring and annual evaluations should be conducted to determine the adequacy of existing management.

## **Goal 6. Collaboration and Coordination with Federal, State, and Local Agencies; Tribal Governments; and Others, as Appropriate**

Benefits realized from noxious weed control will be more noticeable if management of noxious weeds is conducted consistently and efficiently across jurisdictional and political boundaries. If noxious weed control only occurs on federal lands while weeds continue to invade and take over other lands, such as private or state, then the federal land effort is wasted because the source of spread stems from the adjacent infested lands causing infestations to continue cropping up on federal lands. It is imperative that cooperation with federal, tribal, state, and county organizations and private landowners be undertaken so that all entities are efficiently and consistently managing noxious weeds, simultaneously.

## **Goal 7. Monitoring, Evaluation, Research, and Technology Transfer**

No noxious weed plan is complete without effective monitoring and evaluation. It is imperative that data is collected and evaluated on the success stories and failures of noxious weed programs. If a program is not meeting noxious weed control objectives, then management changes are needed to get the program back on track. Monitoring and evaluation tracks the progress of a noxious weed program and informs managers when their program is not effective. Knowledge must be gained through experimentation with various control methods so managers can constantly improve their control methods and advance to effectively control noxious weeds. Once new methods or a combination of methods are discovered they must be transferred to field personnel who administer the noxious weed programs.

# Noxious Weed Control Guidelines for an IWM Strategy

Use the following cultural, physical, biological, and chemical control guidelines to implement and determine the best method(s) for an integrated approach to noxious weed management. (U.S. Department of the Interior, Bureau of Land Management. 1994. Noxious weed strategy for Oregon/Washington. Oregon State Office, Portland, Oregon. BLM/OR/WA/PT-94/36+4220.9.)

## Cultural

### Prevention

1. Develop available preventive measures, such as quarantine and closure, to reduce the spread of the infestation.
2. Determine whether policy and laws allow for the use of all preventive measures, including local quarantine and closure.
3. If past management activities have allowed the introduction and spread of noxious weeds, determine how to change management after selecting a treatment method.

### Livestock Manipulation

1. Determine whether changes in livestock grazing will affect the target weeds. Reduced grazing may allow for increased competition from beneficial vegetation or just allow for more weed seeds to be disseminated. Increased grazing may reduce beneficial vegetation or may be used to reduce weed seed source.
2. Determine whether changes in movement or type of livestock is necessary to reduce or contain the infestation due to movement of seeds on or in the animals.
3. Determine whether containing livestock in a weed free area prior to introduction to the area would prevent new infestations.

### Wildlife Manipulation

1. Determine whether wildlife or wildlife feeding programs can be managed to reduce weed infestations.
2. Determine feasibility of changes in wildlife movement that would reduce or contain the infestation due to movement of seeds on or in the animals.

### Soil Disturbance Activities

1. Revegetate all bare soil following disturbance.
2. Select plant species that will reduce the spread of noxious weeds.
3. Defer soil disturbance if possible until weeds are controlled or under management.

### Rock Sources

1. Develop rock source management plans.
2. Keep use of rock source confined to existing contaminated roads.
3. Keep new or "clean" rock stockpiles separate from contaminated stockpiles.
4. Obtain rock from uncontaminated sources.

### Public Use

1. Determine most feasible land use to reduce and prevent infestations.
2. Determine whether specific public awareness programs could reduce the infestation or control the spread of weeds.
3. Determine whether exclusion is a possibility and how it would affect the weed infestation.

## Physical

### Manual Control

1. Determine whether hoeing or "grubbing" will reduce (or increase) the infestation.
2. Determine whether hand pulling the weeds reduces the seed source.



## **Mechanical Control**

1. Evaluate terrain to allow for mowing and determine whether it is an acceptable option for control of the spread of seeds.
2. Evaluate cultivation and other conventional farming practices options that could be used cost effectively.

## **Control by Burning**

1. Determine whether policy and laws allow controlled burning and address regulations regarding smoke management.
2. Determine whether the terrain and vegetative cover allow for a controlled burn program.
3. Evaluate a controlled burn program to reduce the infestation.
4. Determine long-term effect of burning on nontarget species.

## **Biological**

### **Natural Competition**

1. Determine whether there are naturally occurring agents within the ecosystem which can reduce the infestation.
2. Determine which elements affect naturally occurring control agents. Determine whether these elements can be modified to reduce the negative effect on these agents. Determine whether these elements can be enhanced to increase the effectiveness of these agents on the weed infestation.

### **Introduced Competition**

1. Determine whether biological control agents can be introduced into the ecosystem to reduce the amount of infestation.
2. Determine which introduced biological agents provide an acceptable control method for this infestation.

3. Evaluate if the biological control agent has been tested for adverse effects against all nontarget species within the treatment area.
4. Determine whether the introduced biological agent can survive in the environment of the treatment area.
5. Determine whether policy and laws allow for the introduction of biological control agents.
6. Determine whether policy and laws allow for introduction and grazing of livestock as a biological control measure.

## **Chemical**

### **Fertilization**

1. Determine whether chemical fertilization would reduce the amount of weeds by increasing competition of beneficial plant species.
2. Determine whether increased nitrogen (or other nutrients) would reduce weeds due to direct effect (for example, Curlycup gumweed).

### **Pesticides**

1. Evaluate the acceptability of herbicides (or other pesticides) to control the infestation.
2. Determine whether pesticides are labeled for use on the target weed and use on the infested site (consider nontarget plants, soil type, groundwater location, topography, climate, state labeling). Determine the most effective application techniques.
3. Determine the most effective and cost-efficient types of conventional application equipment.
4. Determine whether properly trained personnel are available to apply the pesticides.

# Appendix 12

## Requirements for Snags and Downed Wood

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# Introduction

## Background on the Snag and Downed Wood Interim Standards Tables

The snag and downed wood interim standards tables in this appendix (Tables 1 through 4) were assembled through a process that combined extensive reviews of the published and unpublished literature, numerous discussions with snag or downed wood experts, and GIS computer modeling. The term “downed wood” as used in this appendix is synonymous with “coarse woody debris”, which is used in Chapters 2 and 3. *Large* downed wood and *large* snags are dead trees greater than 21 inches diameter at breast height.

Following a detailed and extensive review of the literature, a revised set of snag and downed wood density-per-hectare classes for potential vegetation groups (PVGs), successional stages, structural stages, fire regimes, and management scenarios were devised. These were produced in the form of tables in which live tree, snag, and downed wood categories were assigned abundance values according to four stand succession-structure stages. One 24-cell table was produced for each of ten PVG – management scenario – fire regime combinations.

Information on snag and downed wood densities in the scientific literature has several limitations. The information specific to density values was surprisingly scarce, especially when limited to the Interior Columbia Basin. A number of studies contained very detailed snag or downed wood data, but were less applicable because they were conducted outside the study area. Also, a variety of methods was used to count, sample, measure, and report snag and downed wood abundances. Reports citing the number of snags per acre could not be used if all snags were lumped into a single diameter class. Similarly, detailed reports on downed wood abundance could not be used if abundance was reported in 100-hour fuel loads. A third limitation was the manner in which habitats were reported. Forests were often described as “mixed,” either in species composition, age, or both. This made it impossible to assign density figures to a particular potential vegetation group or successional stage. And finally, many studies on forest wildlife, particularly on snag-dependent birds, focused sampling on the particular stand where each species had nested. A number of these species select nest areas where snags are found in clumps or groups. Extrapolation of these figures to the landscape PVG level would have resulted in artificially inflated abundance values. Once all of these factors had been accounted for, the amount of detailed, applicable material was very small. The literature values were used whenever appropriate, then a series of discussions with experts was initiated to help determine appropriate values that could serve as proxies to fill in the gaps in the literature.

Table 1. Large Snags per Acre by Fire Regime and PVG, ICBEMP Project Area.

PVG	Fire Regime	Large Snags/Acre, HRV mid	Large Snags/Acre, HRV - 30%	Large Snags/Acre, HRV + 30%	Large Snags/Acre, Current
Cold Forest	HI	8.1	5.7	10.5	4.6
Dry Forest		2.6	1.8	3.3	1.1
Moist Forest		5.4	3.8	7.0	3.0
Cold Forest	LI	3.8	2.7	5.0	4.2
Dry Forest		0.6	0.4	0.7	2.4
Moist Forest		4.1	2.9	5.4	4.1

Abbreviations used in this table:  
HI - High Intensity  
LI - Low Intensity  
HRV - Historical Range of Variability  
PVG - Potential Vegetation Group

**Table 2. Large Downed Wood per Acre by Fire Regime and PVG, ICBEMP Project Area.**

PVG	Fire Regime	Large Snags/Acre, HRV mid	Large Snags/Acre, HRV - 30%	Large Snags/Acre, HRV + 30%	Large Snags/Acre, Current
Cold Forest	HI	10.1	7.1	13.2	7.9
Dry Forest		3.0	2.1	3.9	2.1
Moist Forest		7.4	5.2	9.6	6.3
Cold Forest	LI	9.2	6.4	11.9	9.2
Dry Forest		0.6	0.4	0.8	3.1
Moist Forest		1.0	0.7	1.3	8.3

**Abbreviations used in this table:**

- HI - High Intensity
- LI - Low Intensity
- HRV - Historical Range of Variability
- LDW - Large Downed Wood
- PVG - Potential Vegetation Group

The snag and downed wood tables went through several reviews and iterations. The final tables were stratified by:

- ♦ three potential vegetation groups (dry forest, moist forest, and cold forest);
- ♦ four successional/structural stages (early seral stands, mid seral stands, late seral single story stands, and late seral multi-story stands);
- ♦ two fire regimes (low intensity, high-frequency stand-maintaining fires and high intensity, low-frequency stand-replacing fires); and
- ♦ three management – time period scenarios (pre-settlement or historical range of variability, current period unmanaged, and current period managed).

For each cell of the table, the components were assigned an abundance class of none, rare, uncommon, common, or abundant. The definitions of these classes varied by component. For instance, 'abundant' for small snags was more than 25 snags per acre, while 'abundant' for large downed wood was more than 10 pieces per acre. The low fire regime was not modeled for current managed conditions since active fire suppression on Forest Service- and BLM-administered lands has effectively removed that fire regime over most of the managed portions of the basin. Also, current conditions, both managed and unmanaged, for the cold forest PVG were not modeled because of the minimal amount of active management, on a basin-wide scale, that occurs in that PVG.

The other PVGs had to be assigned large snag and large downed wood abundance values for modeling purposes. Essentially, this consisted of assigning an abundance of 'none' to all the remaining PVGs, such as the rangeland PVGs, agriculture, rock, water, urban, etc. Once this process was completed, the tables were converted to a single spreadsheet file to be used as input to the ICBEMP GIS for modeling and simulation.

Modeling the snag and downed wood abundances across the basin required a sequence of computations and data layer combinations which were generalized into three major processes. First, a detailed vegetation layer was produced. This required the combination of terrestrial community group database information, potential vegetation group information, and current and historical fire regime data, with the historical year 0 vegetation, current year 0 (Alternative S1 year 0) vegetation, and projected future (Alternatives S1, S2, and S3 100 year) vegetation layers. The results were data layers describing the historical, current, and projected future vegetation distributions (including terrestrial community groups) at the subwatershed level.

Then, snag and downed wood data were combined with the historical, current, and projected future vegetation information to produce large snag and large downed wood density classes, class mid-point values, and strata totals for the historical, current, and projected future potential vegetation groups (PVGs) and terrestrial community groups. This produced snag and downed wood per hectare density values by historical, current, and projected future (100 year) PVGs and terrestrial community groups across the basin.



Table 3. Large Snags per Acre by Fire Regime and PVG, by RAC/PAC.

RAC/PAC	Fire Regime	PVG	Large Snags/Acre, HRV mid	Large Snags/Acre, HRV-30%	Large Snags/Acre, HRV+30%	Large Snags/Acre, Current
Butte RAC	HI	Cold Forest	8.1	5.7	10.5	3.8
		Dry Forest	2.6	1.9	3.4	0.6
		Moist Forest	5.3	3.7	6.9	1.6
	LI	Cold Forest	4.1	2.9	5.3	2.6
		Dry Forest	0.6	0.4	0.8	0.7
		Moist Forest	4.3	3.0	5.6	2.9
Deschutes PAC	HI	Cold Forest	8.1	5.7	10.5	5.0
		Dry Forest	1.8	1.2	2.3	0.5
		Moist Forest	4.7	3.3	6.2	2.4
	LI	Cold Forest	2.4	1.7	3.1	4.6
		Dry Forest	0.5	0.3	0.6	0.6
		Moist Forest	2.0	1.4	2.6	1.4
Eastern Washington RAC	HI	Cold Forest	8.1	5.7	10.5	7.3
		Dry Forest	2.3	1.6	3.0	1.4
		Moist Forest	4.9	3.4	6.4	4.4
	LI	Cold Forest	3.4	2.4	4.5	4.1
		Dry Forest	0.7	0.5	0.9	1.5
		Moist Forest	3.6	2.5	4.7	4.7
Eastern Washington Cascades PAC	HI	Cold Forest	8.1	5.7	10.5	0.4
		Dry Forest	2.0	1.4	2.6	1.9
		Moist Forest	4.6	3.2	6.0	5.4
	LI	Cold Forest	2.8	2.0	3.7	3.1
		Dry Forest	0.4	0.3	0.5	0.6
		Moist Forest	3.8	2.7	4.9	5.2
John Day-Snake RAC	HI	Cold Forest	8.1	5.7	10.5	5.5
		Dry Forest	2.3	1.6	3.0	1.1
		Moist Forest	5.6	3.9	7.3	3.2
	LI	Cold Forest	3.7	2.6	4.9	6.4
		Dry Forest	0.6	0.4	0.8	2.4
		Moist Forest	2.7	1.9	3.5	4.3
Klamath PAC	HI	Dry Forest	1.7	1.2	2.3	0.6
		Moist Forest	4.5	3.1	5.8	3.1
	LI	Cold Forest	2.8	2.0	3.7	4.6
		Dry Forest	0.4	0.3	0.6	0.5
		Moist Forest	2.1	1.5	2.8	4.2
Lower Snake River RAC	HI	Cold Forest	8.1	5.7	10.5	4.7
		Dry Forest	3.6	2.5	4.6	1.3
		Moist Forest	5.5	3.8	7.1	1.1
	LI	Cold Forest	3.7	2.6	4.8	4.3
		Dry Forest	0.5	0.3	0.6	2.1
		Moist Forest	2.9	2.0	3.7	2.7

**Abbreviations used in this table:**

- HI - High Intensity
- HRV - Historical Range of Variability
- LI - Low Intensity
- PAC - Provincial Advisory Committee
- PVG - Potential Vegetation Group
- RAC - Resource Advisory Council
- R1 - Forest Service Northern Region
- R4 - Forest Service Intermountain Region



Table 4. Large Downed Wood per Acre by Fire Regime and PVG, by RAC/PAC.

RAC/PAC	Fire Regime	PVG	LDW/Acre, HRV mid	LDW/Acre, HRV-30%	LDW/Acre, HRV+30%	LDW/Acre, Current
Butte RAC	HI	Cold Forest	10.1	7.1	13.2	10.1
		Dry Forest	3.0	2.1	4.0	3.2
		Moist Forest	7.6	5.3	9.9	3.7
	LI	Cold Forest	9.6	6.7	12.4	9.5
		Dry Forest	0.8	0.6	1.0	2.4
		Moist Forest	1.1	0.7	1.4	6.4
Deschutes PAC	HI	Cold Forest	10.1	7.1	13.2	10.1
		Dry Forest	1.9	1.4	2.5	0.9
		Moist Forest	6.1	4.3	7.9	5.7
	LI	Cold Forest	9.9	6.9	12.8	9.8
		Dry Forest	0.5	0.3	0.6	1.1
		Moist Forest	0.5	0.4	0.7	3.3
Eastern Washington RAC	HI	Cold Forest	10.1	7.1	13.2	9.3
		Dry Forest	2.6	1.8	3.4	4.9
		Moist Forest	7.2	5.0	9.3	9.6
	LI	Cold Forest	9.1	6.4	11.9	9.4
		Dry Forest	1.0	0.7	1.2	4.9
		Moist Forest	1.1	0.8	1.4	10.0
Eastern Washington Cascades PAC	HI	Cold Forest	10.1	7.1	13.2	1.6
		Dry Forest	2.2	1.6	2.9	0.8
		Moist Forest	6.0	4.2	7.8	9.9
	LI	Cold Forest	9.8	6.9	12.7	9.9
		Dry Forest	0.4	0.3	0.5	0.8
		Moist Forest	1.0	0.7	1.3	10.0
John Day-Snake RAC	HI	Cold Forest	10.1	7.1	13.2	7.9
		Dry Forest	2.7	1.9	3.4	1.2
		Moist Forest	7.1	5.0	9.2	5.6
	LI	Cold Forest	8.3	5.8	10.8	9.4
		Dry Forest	0.7	0.5	0.9	2.2
		Moist Forest	0.8	0.6	1.1	6.5
Klamath PAC	HI	Dry Forest	1.9	1.4	2.5	1.1
		Moist Forest	5.6	3.9	7.3	6.3
	LI	Cold Forest	6.0	4.2	7.8	5.8
		Dry Forest	0.4	0.3	0.6	1.2
		Moist Forest	0.7	0.5	0.9	7.9
Lower Snake River RAC	HI	Cold Forest	10.1	7.1	13.2	7.7
		Dry Forest	4.3	3.0	5.6	1.1
		Moist Forest	7.1	5.0	9.2	2.0
	LI	Cold Forest	7.8	5.5	10.2	7.9
		Dry Forest	0.6	0.4	0.7	1.4
		Moist Forest	0.8	0.5	1.0	4.8

**Table 4. Large Downed Wood per Acre by Fire Regime and PVG, by RAC/PAC**  
(continued)

RAC/PAC	Fire Regime	PVG	LDW /Acre, HRV mid	LDW / Acre, HRV-30%	LDW / Acre, HRV+30%	LDW / Acre, Current
Southeastern Oregon RAC	HI	Cold Forest	10.1	7.1	13.2	6.3
		Dry Forest	2.5	1.7	3.2	0.9
		Moist Forest	5.9	4.1	7.7	4.6
	LI	Cold Forest	7.6	5.3	9.9	7.4
		Dry Forest	0.4	0.3	0.6	1.2
		Moist Forest	0.7	0.5	0.9	8.5
Upper Columbia Salmon-Clearwater RAC - R1	HI	Cold Forest	10.1	7.1	13.2	10.1
		Dry Forest	3.9	2.7	5.1	4.3
		Moist Forest	7.8	5.5	10.2	10.1
	LI	Cold Forest	9.8	6.8	12.7	10.0
		Dry Forest	0.7	0.5	0.9	5.0
		Moist Forest	1.1	0.7	1.4	10.1
Upper Columbia Salmon-Clearwater RAC - R4	HI	Cold Forest	10.1	7.1	13.2	7.3
		Dry Forest	3.4	2.4	4.5	4.1
		Moist Forest	8.8	6.1	11.4	8.8
	LI	Cold Forest	9.1	6.4	11.8	9.1
		Dry Forest	0.6	0.4	0.8	4.2
		Moist Forest	0.9	0.6	1.2	8.6
Upper Snake River RAC	HI	Cold Forest	10.1	7.1	13.2	8.3
		Dry Forest	9.8	6.9	12.7	3.8
		Moist Forest	10.1	7.1	13.2	9.8
	LI	Cold Forest	7.7	5.4	10.1	7.8
		Dry Forest	0.6	0.4	0.8	3.4
		Moist Forest	0.8	0.6	1.1	9.4
Yakima PAC	HI	Moist Forest	9.6	6.7	12.5	0.4
	LI	Dry Forest	0.4	0.3	0.5	0.4

**Abbreviations used in this table:**

HI - High Intensity  
 LI - Low Intensity  
 HRV - Historical Range of Variability  
 LDW - Large Downed Wood  
 PAC - Provincial Advisory Committee  
 PVG - Potential Vegetation Group  
 RAC - Resource Advisory Council  
 R1 - Forest Service Northern Region  
 R4 - Forest Service Intermountain Region



The third step was the use of a weighted averaging method based on subwatershed area. This provided data that were summarized to produce tables of small and large snag and downed wood densities by fire regime and PVG for each Resource Advisory Council/Provincial Advisory Committee (RAC/PAC) area and for the entire basin.

One caveat to consider is that the values for snags and downed wood for the riparian woodland PVG used modified values from the moist forest as proxies since no other data were available. Also, the riparian woodland PVG tended to occur in small, scattered clumps or in narrow stringers which were sometimes underestimated at the 1 square kilometer scale. The use of proxy values and the possibility of lower than actual amounts as a result of the mapping scale must be recognized and allowed for when using the values for this potential vegetation group.

## Snag and Downed Wood Step-down Prototype

### Refinement of Historic Range of Variability Interim Standards

The Supplemental Draft EIS includes interim standard densities for snags and downed wood to be used in designing field projects. Development of the interim densities of snags and downed wood used in the analysis of Supplemental Draft EIS effects has been previously described. The Supplemental Draft EIS direction recognizes that these broad standards may require fine-tuning for more local ecological conditions. Refinements to the Supplemental Draft EIS snag and downed wood densities interim standards should be conducted with a standardized and consistent process within ecologically similar large landscapes (for example ecoregions) across the interior Columbia Basin project area. There are several important considerations for developing refinements:

- ♦ Refinements should be made across relatively large and ecologically similar landscapes. A consistent biophysical stratification should be used across the entire project area. Refinements should be developed within strata.

- ♦ Refinements should be within the disturbance regimes, potential vegetation groups, and structural stages from the Supplemental Draft EIS analysis to allow summarization and comparison at the broad scale. The stratification of disturbance regimes, potential vegetation groups, and structural stages should be coordinated across biophysical strata to minimize inconsistencies. Ecoregions (Bailey 1995) are suggested. There may be sufficient rationale to use different combinations in different strata, but this should be minimized to the extent possible.
- ♦ The refined snag and downed wood densities should be considered the desired range. Higher levels of snags and downed wood might be desirable or necessary to meet specific wildlife habitat needs, but may increase fire risks and affect such site factors as nutrient availability.
- ♦ Alternative methods should be available for refining snag standards based on the need for rigor and data availability.
- ♦ Forest Service and BLM administrative units will likely need to estimate both historical and current densities of snags and downed wood, using the same strata, as a context for finer scale analyses or designing field projects. It may also be desirable to estimate densities of large live trees by shade-tolerant and shade-intolerant (or finer) classes since these are the sources of large snags.

The step-down refinement of the interim standards could be accomplished by assigning large live tree, snag, and downed wood density (per acre numbers) classes by disturbance regime, potential vegetation group, structural stage, and management history strata within each ecological landscape area. This model refinement could be developed through vegetation dynamics modeling, sampling of historical densities using the general land office survey reports or other information, and expert opinion. Refined models could be extrapolated across the project area using the Hessburg et al. (1999) mid-scale estimates of Historical Range of Variability for structural stages by subregion or using some other biophysical stratification (ecological subregions, biophysical provinces, or RAC/PAC areas, for example).

## General Process

**Document assumptions, process, and results for all steps.** Careful documentation of methods, data sources, and assumptions will reduce the difficulties that will arise from challenges to results. Good documentation will also allow future work to build on past efforts.



**Step 1. Develop stratification of biophysical subregions, potential vegetation groups, and stand structure classes.** The stratification used should be hierarchically linked to the Supplemental Draft EIS effects analysis and should be flexible for further refinement at finer scales. Hessburg's subregionalization work, Bailey's ecoregion or ecosubregion hierarchy, and maps of potential natural vegetation series, plant association groups or plant associations, RAC/PAC areas or other stratifications could be useful. In general, areas the size of subbasins or groups of subbasins will be most useful as biophysical stratifications. Finer stratifications run the risk of focusing on areas with anomalous disturbance or management histories. This does not imply that hydrologic units are the best biophysical stratification. Fire and vegetation processes are often not related to subbasin or watershed boundaries. Keep numbers of strata to a reasonable minimum.

**Step 2. Estimate current large live tree, snag and downed wood densities by stratum within the ecological subregional area.** Current densities of large, old trees may provide clues about the historical range of variability. In addition, summaries of the current condition will provide a basis for understanding the departure or change from historical conditions. Several options for estimating current snag and downed wood densities exist, the utility of each depending on the availability of statistically sound data, the degree of rigor required, and the availability of resources necessary to gather new data. Managed stands (for example, those with snags, downed wood, or live tree structure altered by direct human activity) should be separated from "natural" stands. "Natural" stands may provide useful clues about the composition and structure of vegetation since the end of the Little Ice Age (approximately 1820-1850) settlement conditions. Be aware that significant changes to disturbance patterns have generally occurred in the last 150 years and often have affected stand composition and structure.

**Option 1. Use Existing Data. This option is useful where statistically sound data exist at the appropriate scale.** The Forest Service's Pacific Northwest Region has Current Vegetation Survey sample plots at 1.7 mile and 3.4 mile spacing throughout National Forest lands. This is a statistically sound sample that can be analyzed using the Current Vegetation Survey Tools package in preparation; contact John Teply, the Forest Service's Pacific Northwest Region, Regional Office. Plot numbers are probably insufficient to analyze at landscape scales below individual subbasins or collections of several watersheds or subwatersheds. Similar data may be available in other areas.

Forest Inventory Analysis plot data may be available for National Forests and BLM-administered lands outside the Forest Service's Pacific Northwest Region. Forest Inventory Analysis plot data are available on non-Forest Service lands in the Forest Service's Pacific Northwest Region. These data sets may not include measurements of snags or downed wood, but the tree data may be useful for model calibration. Note – stand exams are not usually installed with a statistically valid design that allows aggregation to areas outside the examined stands, especially for snags and downed wood. Generally, stand exam data should not be aggregated to larger landscapes. Apply stratification to existing data, if those data are usable. Stratification within biophysical landscapes should be a hierarchical subdivision of the disturbance regimes and potential vegetation groups used in the EIS process. Potential vegetation types or plant association groups can be used down to groups of watersheds. Stratifications should be relatively broad at the mid-scale (for example, a few cover type/structure stage strata in each biophysical stratum). Available data may not support fine mid-scale stratification. Mid-scale stratification should recognize important ecological differences in a few, simple strata. Analyses at finer scales (for example, Ecosystem Analysis at the Watershed Scale) could recognize finer differences, if necessary.

Generate estimates and confidence intervals by stratum.

**Option 2. Collect new data.** This option is most appropriate where resource risks or expected legal challenges to management decisions are likely to justify the relatively high cost of data collection. Be aware that collecting new data, while tempting, may not provide useful information without careful attention to sample design and that the cost, difficulty, and time involved may not be justified without careful thought about the need for rigor or fine resolution (for example, many strata at the mid-scale).

Sampling costs go up in proportion to number of strata and samples required per stratum. Decide on the degree of confidence needed in the estimates per stratum and, hence, on the sample sizes needed per stratum. Input from the Science Advisory Group (SAG) can be beneficial in developing a sampling strategy. This involves making initial estimates of the variability within stratum. The time and resources may not be available to collect new data. If so, document possible impacts on end results.



Collect samples using standardized methods (Max et al. [1996], Bate et al. [1999]). It is essential that samples be representative of landscapes rather than of individual stands. Samples of individual stands (for example, stand exams) are notoriously difficult to aggregate to larger landscapes in a statistically rigorous fashion.

Generate estimates and confidence intervals by stratum.

**Option 3. Use a formal process to summarize expert opinion.** This would generally only be useful where there is little need for rigorous estimates. Some formal process (for example, Bayesian belief network models or similar methods) should be used to document assumptions and models used. Document sources, experts participating, assumptions, process and results.

**Step 3. Summarize historical live tree, snag and downed wood densities from available information.** Gather existing information on historical densities of snags and downed wood from any sources that might seem relevant. Document sources and their limitations. Useful data may exist in the General Land Office Surveys (for live tree densities), historical records, and photographs. Data should be summarized for each stratum. If expert opinion is the only available data source, then consider using a system to formalize expert belief systems (for example, Bayesian belief networks or similar methods). Gather experts with local knowledge for one or more knowledge-summarizing sessions. Be clear about assumptions. Document process and results.

**Step 4. Project densities under historical conditions by stratum.** The objective should be to develop probability distributions of snag and downed wood densities for historical conditions. Probability distributions would become the reference conditions that are the basis of revised standards by biophysical stratum. Stand or snag/downed wood models (TELSA/VDDT, FVS, Marcot/Mellen, Wright, etc.) will be useful and should be tested during a prototype study. Current large live tree, snag and downed wood estimates (from step 2), especially for lands that have not been directly altered by human activities, may be useful for model calibration. These must be used with caution because fire suppression has occurred on most lands. An integration of data from existing unmanaged areas, expert opinion, and historical records may be the most useful way to estimate historical conditions. Be clear about assumptions. Document process and results.

## Prototype

A prototype process could develop, refine, and document methods. Ideally, a prototype (or more than one) would take place in a single large landscape area (for example, the Grande Ronde and/or John Day River subbasins) that contains useful existing data, substantial forested areas with no data, and sources of expert opinion. Methods for determining current densities and refining historical range of variability estimates should be developed, tested, and documented in published reports. A prototype should test several options for gathering and summarizing information about current live tree, snag, and downed wood densities.

### **Determine Current Snag and Downed Wood Density and Distribution**

Review and summarize existing data. Compare to Harris (1998) data, and the Decadent Wood Advisory Model and OR-WA Species Habitat Project database, once available.

Collect new data, if necessary, where no data exist. Review and select sampling methods, considering Bate and others (1999) methods for snags and large trees (at the stand exam scale), Bull et al. (1990), Brown (1974), and Current Vegetation Survey (Max et al. 1996) methods. Collecting new data may prove too expensive or time-consuming. If so, consider using expert opinion, but be aware that results may have little or no statistical validity.

### **Determine Historical Range of Variability for Snag and Downed Wood Density and Distribution**

Estimates of snag and down wood density probability distributions will likely require modeling stand dynamics over time using TELSAs/VDDTs, FVS, and other tools. The prototype should test and evaluate the utility of various existing modeling tools. Some information on the historic density of live trees, for model calibration, might be available from General Land Office surveys (generally done from 1860 to the early 1900s for some areas). These can be summarized to provide estimates of live tree stand structure in the early European settlement period (General Land Office methods from Ochoco National Forest, Dave Maercklein). Assumptions about the relation of snag



and downed wood levels to live tree structure, as revealed by General Land Office data analysis, would need formulation and documentation. Also, see methods used by Arno et al. (1993), Beukema et al. (1999), Everett et al. (1997), Harris (1998), and Harrod et al. (1998) for historical stand structures and snag amounts. It may also be possible to use the FVS and VDDT models for historical range of variability simulation of stand, snag, and downed wood dynamics.

## Wildlife Species Requirements

There is a large body of literature on wildlife (mostly birds) snag and downed wood requirements, and various methodologies and approaches to determining required amounts and distributions. These include Bate et al. (1999), Bull et al. (1997), Cline and Philips (1983), Lundquist and Mariani (1991), Marcot (1988), Neitro et al. (1985), Ohmann et al. (1994), Parks et al. (1997), Raphael et al. (1992), Raphael and White (1984), Raphael (1983), Saab and Dudley (1998), and Thomas et al. (1979). Much of this information is being summarized for the Forest Service's Pacific Northwest Region by Marcot and others for the OR-WA Species Habitat Project and Decadent Wood Advisory Model.

## Project Future Amounts

A number of models are available that project snag dynamics over time. They include Beukema et al. (1999), Bull et al. (1980), Cimon (1983), Cline et al. (1980), Everett et al. (1997), Harcombe (1987), Harrod et al. (1998), Hessburg et al. (1995), Huggard (1997), Lambert et al. (1980), Marcot (1988), Morrison and Raphael (1993), Neitro et al. (1985), Raphael et al. (1992), Raphael and Morrison (1987), Raphael and White (1984), Raphael (1983), and Thomas et al. (1979). Unfortunately, many of these models do not include methods or processes for the projection of downed wood amounts. It may be possible to interactively link some of the models with the TELSA/VDDT models and the ICBEMP CRBSUM data layers.

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# Appendix 13a

## Biological Crust Evaluation

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# Introduction

Biological crusts (also called microbiotic crusts) consist of lichens, bryophytes, algae, microfungi, cyanobacteria, and bacteria growing on or just below the soil surface (Eldridge and Greene 1994). Cover types in the project area that can be associated with substantial biological crust development include: salt desert shrub, low sagebrush, big sagebrush, and juniper woodland.

Biological crusts play a role in soil stability, nutrient cycling, and soil moisture, and in interactions with vascular plants. Lichens and algae provide forage for invertebrates, and some lichens provide forage for big game species during critical winter periods (Thomas and Rosentreter 1992). The ecological role of biological crusts is probably most substantial in arid ecosystems in which above-ground productivity is inherently low. More research needs to be conducted on biological crusts to ascertain their ecological roles, particularly with regard to hydrology, nutrient cycling, energy flow, and biodiversity.

Activities that disturb the soil surface—including grazing, off-road vehicle use, recreational hiking, and others—can reduce the maximum potential development of biological crusts. There has been a lack of research conducted within the basin to ascertain the response of biological crusts to land use disturbances such as livestock grazing. This part of the appendix describes the use of a matrix to analyze the effects of livestock grazing on biological crust in an environmental assessment or environmental impact statement.

## Use of the Biological Crust Matrix

The matrix is split into two main parts:

1. Potential for biological crust development based on biological and physical factors.
2. Potential for management actions to negatively impact biological crusts.

## I. Potential for biological crust development based on biological and physical factors.

The first step in use of the matrix is to determine whether or not the site has the potential to support a well-developed biological crust. Knowledge of local ecological sites (particularly soil characteristics and vegetation potential) is essential for use of the matrix. The factors listed are closely related and are components of the ecological site description, however variation in any one factor can influence biological crust cover and its relative importance to the ecological stability of the site.

In general, ecological sites dominated by shrubs listed in the first column will consistently have a well-developed biological crust. The main characteristic that will modify crust cover is soil surface texture. For example, low sagebrush communities often have a well-developed biological crust. Low sagebrush communities on calcareous, gravelly loams and silt loams (such as alluvial deposits from the Lemhi Range) have well developed lichen crusts that occupy fine-textured, mineral soil within the gravel matrix (and, in fact, are protected by the gravel). In contrast, low sagebrush communities occurring on rocky, well-drained, rhyolitic (volcanic) soils in the Owyhee Mountains have little potential for crust development due to high cover of rock fragments and coarser, rhyolite-derived soils.

A second important criterion is the potential herbaceous plant density. Note that mountain big sagebrush is listed in the "moderate", "low", and "very low" columns in part 1 of the sample matrix. Communities at the drier end of the mountain big sagebrush zone will have greater cover of biological crust due to lower density of herbaceous plants, limited by effective precipitation. More productive sites will have mosses and lichens beneath a dense herbaceous layer. However the vascular plant component has higher cover and is more important in these communities for soil protection relative to the biological crust.

Status of existing vegetation on the site is determined using the "Current ecological condition" or categories

under "Artificial seedings". Sites where vegetation structure has been modified due to introduction of invasive weeds or rhizomatous grasses seeded into areas that historically supported bunchgrass vegetation will have reduced potential for biological crust. Sites that have become dominated by annual species such as cheatgrass or medusahead wildrye have lowered potential for biological crust development due to high plant density, litter accumulation, and frequent fire. Biological crusts will recover on burned sites seeded with bunchgrasses, forbs and shrubs, if the resulting community structure is similar to that of the potential natural community and if it contains open interspaces.

## **2. Potential for management actions to negatively impact biological crusts.**

After determining the potential for biological crust development, livestock impacts can be evaluated using two criteria: season of use and utilization levels (from monitoring data). Biological crusts require moisture for growth and reproduction; however moisture requirements are small compared to that required by vascular plants. Growth is promoted by cool season, as opposed to summer, moisture. Biological crusts are fragile when dry (dormant), but quite pliable when moist. The least impact occurs when the crust is moist or frozen. Regrowth potential is greatest during periods when cool season moisture is consistent for several weeks. For example, late fall use has low impacts because: 1) the biological crust is likely to be moist and pliable due to dew, frost, and periodic rain; 2) there is a considerable length of time between the period of use and the dry, hot season. Late spring use may also occur due to dew, frost, and rain; however, the dry, hot season is imminent and the crust may not have time to recover from trampling impacts via reattachment and regrowth. Once the crust is fragmented, the soil surface is vulnerable to erosion by wind and water. In addition, the crust fragments can be removed from the site along with surface soil, reducing the potential for future recovery.

Vegetation use is representative of animal stocking rates or length of grazing period. Hoof action affects the crust (the crust is not grazed). Severe to high use is indicative of localized concentration of animals and heavy trampling. Again, trampling impacts will be somewhat dependent on season of use and soil texture.

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## Biological Crust Matrix.

### 1. Potential for biological crust development based on physical and biological factors (based on site potential):

	High	Moderate	Low	Very Low
Dominant tree or shrub	salt desert shrub Wyoming big sagebrush basin big sagebrush low sagebrush black sagebrush stiff sagebrush	Wyoming big sagebrush basin big sagebrush mountain big sagebrush low sagebrush black sagebrush stiff sagebrush	mountain big sagebrush xeric big sagebrush subalpine big sagebrush threetip sagebrush silver sagebrush alkali sagebrush fuzzy sagebrush juniper pinyon pine	mountain big sagebrush mountain shrub
Herbaceous plant density	low	low-moderate	moderate-high	high
Dominant herbaceous life form	bunchgrass	bunchgrass	rhizomatous	rhizomatous
Annual precipitation	<12"	12-14"	>14-16"	>16"
Soil surface texture	silts silt loams clays (excluding shrink/swell clays)	loamy	sandy	coarse sand gravel or broken rock (>80% rock fragment)
Historical fire return interval	>50 years	25-50 years	10-25 years	<10 years
Current ecological condition	mid- to late-seral or potential natural community	early- to mid-seral	disturbed to early-seral	disturbed with/without high weed cover
Artificial seedings				
Date since seeding	>20 years	10-20 years	5-10 years	<5 years
Primary seeded life-forms	bunchgrasses	bunchgrasses	rhizomatous grasses	rhizomatous grasses

### 2. Potential for management actions to negatively impact biological crusts:

	High	Moderate	Low	Very Low
Livestock season of use	summer	late spring	early spring late fall	winter
Vegetation utilization	severe to high	moderate	light	slight

## Example: Completed Biological Crust Matrix

The following is an example of a completed biological crust matrix. The top part of the matrix indicates that the potential for biological crust cover is high and season of use by livestock should result in low impact to the crust. However, level of use when livestock are present is high (for example, more than 80 percent utilization). This indicates that impacts of livestock on biological crust are probably significant due to

vegetation use levels and the associated trampling impacts. Field observations support this analysis as biological crust is present but highly fragmented (clumps less than one inch in diameter) and is primarily restricted to protected areas under shrubs. Reducing livestock numbers would probably result in improved cover and distribution of biological crust.

### Example - Biological Crust Matrix.

#### 1. Potential for biological crust development based on physical and biological factors (based on site potential):

	High	>Moderate	>Low	>Very Low
Dominant tree or shrub	salt desert shrub ✓ Wyoming big sagebrush basin big sagebrush low sagebrush black sagebrush stiff sagebrush	Wyoming big sagebrush basin big sagebrush mountain big sagebrush low sagebrush black sagebrush stiff sagebrush	mountain big sagebrush xeric big sagebrush subalpine big sagebrush threetip sagebrush silver sagebrush alkali sagebrush fuzzy sagebrush juniper pinyon pine	mountain big sagebrush mountain shrub
Herbaceous plant density	low ✓	low-moderate	moderate-high	high
Dominant herbaceous life form	bunchgrass ✓	bunchgrass	rhizomatous	rhizomatous
Annual precipitation	<12" ✓	12-14"	>14-16"	>16"
Soil surface texture	silts ✓ silt loams clays (excluding shrink/swell clays)	loamy	sandy	coarse sand gravel or broken rock (>80% rock fragment)
Historical fire return interval	>50 years ✓	25-50 years	10-25 years	<10 years
Current ecological condition	mid- to late-seral or potential natural community	early- to mid-seral	disturbed to early-seral ✓	disturbed with/without high weed cover
Artificial seedings				
Date since seeding	>20 years	10-20 years	5-10 years	<5 years
Primary seeded life-forms	bunchgrasses	bunchgrasses	rhizomatous grasses	rhizomatous grasses

#### 2. Potential for management actions to negatively impact biological crusts:

	High	>Moderate	>Low	>Very Low
Livestock season of use	summer	late spring	early spring ✓ late fall	winter
Vegetation utilization	severe to high ✓	moderate	light	slight





# Appendix 13b

## Healthy Rangelands Standards and Guidelines

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### Summary

Appendix 13b is a reprint of the Standards for Rangeland Health and Guidelines for Livestock Grazing Management (August 12, 1997), known as the Healthy Rangelands Initiative, for BLM-administered lands in Idaho, Montana, and Oregon/Washington. The alternatives analyzed in this EIS include management direction intended to complement or support, rather than replace, these Standards and Guidelines. Inclusion of these BLM Standards and Guidelines is for the reader's convenience. These documents have been reformatted for this appendix, but their content has not been changed.

Appendix 13b (approximately 10 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.





# Appendix 14

## EIS Team

### Guidance to SAG

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# Introduction

Appendix 14 is the guidance that the EIS Team provided to the Science Advisory Group (SAG) in spring 1999 to assist them in modeling the effects of Alternatives S1, S2, and S3. It is based on the management intent and direction for BLM- and Forest Service-administered lands, described in Chapter 3 of this Supplemental Draft EIS. The EIS Team refers to the guidance in this appendix as “storylines”. Storylines were developed for each of 26 categories, or areas (described below) and for each of six potential vegetation groups (PVGs): dry forest, moist forest, cold forest, dry grass, dry shrub, cool shrub. The storylines consist of a probability of being implemented in the short-term, and a rate of application on-the-ground, for six restoration management activities: timber and silviculture, rangeland management, noxious weed control, reduction of road effects, prescribed fire, and aquatic/hydrologic restoration.

The categories, management activities, probabilities of implementation, and rates of application are listed below. General assumptions and specific assumptions for each of the six potential vegetation groups are listed next, followed by a description of the management prescriptions recommended to simulate the alternatives. Storyline tables (Tables 1 through 6) are provided next, one for each potential vegetation group.

Appendix 14 concludes with a discussion of funding allocations to high restoration priority subbasins in Alternatives S2 and S3, with Tables 7 and 8.

## Categories

‘Categories’ refers to land areas as used in this document. There are 26 different categories identified, each of which has a distinct management intent or emphasis that is the result of implementation of management direction. These categories sometimes overlap; for example, an aquatic A2 subwatershed might lie within a terrestrial T watershed. Therefore, it is possible that the basic unit of land classification, which is a 247-acre (1 square kilometer) pixel, can be assigned to 2 or more different categories and have 2 or more different management intents or emphases. Such a situation would become problematic on the ground, so one management intent must prevail. Therefore, for purposes of this exercise, each 247-acre pixel in the project area was assigned to only one of the 26 categories (land areas) so that each pixel would have a distinct category label. This was done to

accommodate SAG landscape modeling in which management prescriptions were tied to distinct types of management emphasis, where only one management prescription can be applied to each pixel.

A hierarchy was used to apply a category – and therefore a management prescription – to each pixel. The hierarchy was developed by the EIS Team and reflects a gradient that goes from most restrictive management to least restrictive management. For example, the highest category (most restrictive) in the hierarchy is MAC 1 areas, which represent congressionally designated areas such as wilderness and wilderness study areas. A pixel that could be placed into more than one category was assigned for the purposes of this exercise to the category that was highest in the hierarchy.

The categories are listed in this appendix in hierarchical order, with a brief discussion of restoration activities the EIS Team intended for each during the development of the restoration strategy (especially *Objective R-O4*). It is intended that the types and mix of restoration activities (timber and silvicultural treatments, rangeland management, noxious weed control, reduction of adverse road effects, prescribed fire, and aquatic-riparian condition/hydrologic processes) would vary depending on the management emphasis or priority for the area being restored. The emphasis or priority depends on management intent and management direction, which would vary depending on the area, such as A2 subwatersheds or economic restoration priority subbasins. This appendix refers to management of lands administered by the Forest Service or the BLM only.

To aid in visualization and location of the following categories within the project area, numerous maps were created. The aquatic A1 and A2 subwatersheds for Alternative S2 are shown on Map 3-11 and for Alternative S3 on Map 3-12 (in Chapter 3). Map 3-10 shows the T watersheds for both Alternatives S2 and S3 (there is no difference in T watersheds between the two alternatives). The 40 high restoration priority Subbasins for Alternative S2 are shown on Map 3-8 and the 51 high restoration priority subbasins for Alternative S3 are shown on Map 3-9. The broad-scale restoration priorities for Landscape, Aquatic, Water Quality, Old-forest/Rangeland Habitat, Economic, and Tribal are shown on Maps 3-2, 3-3, 3-4, 3-5, 3-6, and 3-7, respectively.

1. **MAC (Management Area Category) 1** – [wilderness, wilderness study areas, wild and scenic rivers, etc.]. Restoration activities would be primarily passive in these areas. An exception is noxious weed control, which would occur at an increased level in the dry grass and dry



shrub PVGs compared with other PVGs to secure the grasslands, shrublands, and shrub-grasslands from noxious weed invasion and spread. These vegetation types are relatively more susceptible to noxious weeds compared with other vegetation types. Management ignited prescribed fire would be used where "wildland fire use for resource benefit" (previously referred to as prescribed natural fire) is not effective. Expected activity levels are assumed to be low but, to the extent possible, the intent is to treat entire watersheds or subwatersheds when prescribed fire is necessary.

2. **A1 subwatersheds** — These areas are assumed to be at or near attainment of aquatic objectives. However, when restoration activities are implemented, the emphases of fostering maintenance and/or restoration of aquatic and riparian health would be achieved through: (1) altering livestock grazing management strategies, (2) controlling noxious weeds, and (3) reducing adverse road effects. In addition, there may be some need for prescribed fire. Other restoration activities would be primarily passive.
3. **T watersheds** — These areas contain terrestrial source habitats that are assumed to be the most sustainable through time compared to source habitats outside T watersheds. The emphasis of restoration activities would be to benefit terrestrial species that have had broad-scale declines in geographic extent of their source habitats. Restoration activities would include: (1) altering livestock grazing management strategies, (2) controlling noxious weeds, (3) reducing adverse road effects, (4) conducting prescribed fire, and (5) silviculture. Livestock grazing management strategies may need to be altered to: (1) reduce the likelihood of noxious weed introduction into uninfested areas, (2) reduce noxious weed spread within infested areas, and (3) provide for adequate herbaceous fuel amounts to permit periodic prescribed fire on rangelands to achieve vegetation species composition and structure that is more characteristic of late seral conditions. Other restoration activities would be primarily passive management. The intent is for these restoration activities to be directed to the cover type-structural stages listed in Tables 3-4 through 3-9 (in Chapter 3).
4. **Urban-rural-wildland interface (URWI)** — The emphasis of restoration activities in these areas is to minimize the buildup of fuels in woody and herbaceous (such as cheatgrass and medusahead) vegetation to minimize effects of wildfire on people and their structures. Restoration activities would include: (1) timber and silvicultural treatments, (2) prescribed fire, (3) noxious weed control, particularly in the dry grass and dry shrub PVGs where exotic herbaceous fuels frequently are present, and (4) altering livestock grazing management strategies.
5. **A2 subwatersheds outside high restoration priority subbasins (HRPs)** — These areas have a greater need for restoration to conserve and secure aquatic and riparian habitat compared to A1 subwatersheds. Restoration management emphasizes reduction of sediment delivery and enhancement of aquatic and riparian habitat. Restoration activities would include: (1) reducing adverse road effects (such as decreasing sediment delivery) on aquatic and riparian areas, (2) instream and/or riparian restoration activities that restore aquatic and riparian species habitat, (3) prescribed fire, (4) silvicultural treatments to reduce effects from severe disturbances (such as uncharacteristic wildfires), (5) altering livestock grazing management strategies, and (6) controlling noxious weeds. Other restoration activities would be primarily passive.
6. **Riparian Conservation Areas (RCAs) outside high restoration priority subbasins (HRPs)** — The discussion for A2 subwatersheds outside high restoration priority subbasins would apply to these areas as well; however, the rate of active restoration would be comparatively slower because of the greater emphasis on restoring A2 subwatersheds.
7. **Unroaded areas that are larger than 5,000 acres outside high restoration priority subbasins (HRPs)** — The emphasis of restoration management in these areas would be to reduce risks of and adverse effects from large, severe disturbance events. Prescribed fire would occur at higher rates in these areas compared to the MAC 1 areas (Category 1).
8. **Old forest outside high restoration priority subbasins (HRPs)** — The emphasis of restoration management in these areas would be to reduce old-forest habitat fragmentation (that is, enhance old-forest connectivity) to maintain, secure, and restore old-forest source habitats. Restoration activities would include: (1) timber



harvest and silvicultural treatments, (2) prescribed fire, and (3) reducing adverse road effects. Other restoration activities would be primarily passive.

9. **A2 subwatersheds *within* high restoration priority subbasins (HRPs)** — These areas have a greater need for restoration to conserve and secure aquatic and riparian habitat compared to A1 subwatersheds. Restoration activities in A2 subwatersheds within high restoration priority subbasins would be similar to A2 subwatersheds outside high restoration priority subbasins; however, there would be a greater emphasis on timber and silviculture and prescribed fire to secure aquatic and riparian habitats from threats of extensive wildfire. In addition, a more rapid rate of restoration would occur in A2 subwatersheds within high restoration priority subbasins than in those outside the high priority subbasins because of greater management emphasis in the high priority subbasins.
10. **RCAs *within* high restoration priority subbasins (HRPs)** — The discussion for A2 subwatersheds within high restoration priority subbasins would apply to these areas as well. The types of restoration activities in these areas would be similar to, but would proceed at a faster rate than, activities in RCAs outside high restoration priority subbasins because of greater management emphasis in the high priority subbasins. The intent is to avoid short-term risks to aquatic and riparian resources; therefore, some restoration would be passive.
11. **Unroaded areas that are larger than 5,000 acres *within* high restoration priority subbasins (HRPs)** — The emphasis of restoration management in these areas would be to achieve vegetation species composition and structure that is more consistent with the climate, landform, and biological and physical characteristics of the landscape. There would be slightly greater emphases on prescribed fire, timber and silvicultural treatments, and altering livestock grazing management strategies (to provide adequate amounts of herbaceous fuels to permit the increased emphasis on prescribed fire) in these areas compared with unroaded areas outside high restoration priority subbasins. The type, amount, and rate of noxious weed control would be similar to that in MAC 1 areas (Category 1). Other restoration activities would

be primarily passive.

12. **Old Forest *within* high restoration priority subbasins (HRPs)** — The emphasis of restoration management to reduce old-forest habitat fragmentation and enhance old-forest connectivity in these areas would be greater than for old forest outside high restoration priority subbasins. Restoration management activities would include timber and silvicultural treatments, prescribed fire, and reducing adverse road effects.

Categories 13 through 25 below refer to the high restoration priority subbasins shown on Maps 3-8 and 3-9. Labels given to each category (for example, Biophysical/Economic/Aquatic/Tribal Priority) reflect the major needs for restoration for those subbasin(s) as determined by the EIS Team. (See Appendix 15 for more detail on the development of high restoration priority subbasins.)

The discussion below on Subbasin Review and Ecosystem Analysis at the Watershed Scale (EAWS) applies to the entire land area within high restoration priority subbasins. However, the discussions of restoration activities and restoration emphases beneath each category apply only to those areas within the high restoration priority subbasins that were not previously accounted for in categories 1, 2, 3, 4, 9, 10, 11, or 12.

In Alternative S2, Subbasin Review would be completed for each of the 40 high restoration priority subbasins within two years after the ICBEMP Record of Decision (ROD) is signed. Subbasin Review will aid in providing the context and the priority for finer scale analysis such as Ecosystem Analysis at the Watershed Scale (EAWS) within these subbasins (Ecosystem Review at the Subbasin Scale, ICBEMP, August 1999 draft). The intent is that EAWS would aid in planning and designing restoration activities, including the types, locations, and sequence of restoration activities. The two-year requirement for conducting Subbasin Reviews would not apply in Alternative S3 (although all Subbasin Reviews in the project area must be completed within five years after the ROD is signed). Subbasin Reviews would still assist in providing the context and priority for finer scale analysis such as EAWS under Alternative S3, and the intent of EAWS would be the same under Alternative S3 as it is under Alternative S2.

13. **Biophysical/Economic/Aquatic/Tribal Priority** — The Upper Grande Ronde subbasin is the only subbasin in this category for Alternatives S2 and S3. Management activities in this



subbasin would focus on restoration of (1) old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes; and on providing economic benefits to tribal communities and other isolated and economically specialized communities. This subbasin has the greatest number and diversity of restoration needs/priorities in the project area; therefore it would probably require a coordinated emphasis on all types of restoration activities (timber harvest and silvicultural treatments, altered livestock grazing management strategies, noxious weed control, reducing adverse road effects, prescribed fire, and aquatic-riparian condition/hydrologic processes).

14. **Biophysical/Economic/Aquatic Priority** – The Lower John Day, Middle Fork John Day, Upper John Day, and Goose Lake subbasins, all in Oregon, are the four subbasins in this category for Alternatives S2 and S3. Management activities would focus on restoration of (1) old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes; and on providing economic benefits to isolated, economically specialized communities. A coordinated emphasis on all types of restoration activities (timber harvest and silvicultural treatments, altered livestock grazing management strategies, noxious weed control, reducing adverse road effects, prescribed fire, and aquatic-riparian condition/hydrologic processes) probably would be required in these subbasins.
15. **Biophysical/Economic/Tribal Priority** – The Upper Coeur d'Alene subbasin is the only subbasin in this category for Alternatives S2 and S3. Management activities would focus on restoration of (1) old forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes; and on providing economic benefits to tribal communities and other isolated, economically specialized communities. There would be greater emphasis on using timber harvest and silvicultural treatments, and noxious weed control, for restoration; and slightly less emphasis on reducing adverse road effects and on altering livestock grazing management strategies, compared with subbasins in categories 13 and 14 (Biophysical/Economic/Aquatic/Tribal and Biophysical/Economic/Aquatic).
16. **Biophysical/Aquatic/Tribal Priority** – The Middle Columbia-Hood subbasin is the only subbasin in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of (1) terrestrial old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes; and would be directed towards providing economic benefits to tribal communities. A slightly greater emphasis would be placed on restoration of aquatic-riparian condition/hydrologic processes compared with subbasins in category 13 (Biophysical/Economic/Aquatic/Tribal).
17. **Biophysical/Economic Priority** – The Middle Fork Payette, Little Wood, Upper Snake-Rock, and Beaver-Camas subbasins, all located within Idaho, are the four subbasins in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of (1) terrestrial old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes; and would be directed towards providing economic benefits to isolated and economically specialized communities. See the description for category 15 (Biophysical/Economic/Tribal) for additional information on the emphases for restoration activities.
18. **Biophysical/Aquatic Priority** – The North Fork John Day subbasin is the only subbasin in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of (1) terrestrial old forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes. There would be a slightly greater emphasis on reducing adverse road effects and on restoration of aquatic-riparian condition/hydrologic processes compared with subbasins in category 13 (Biophysical/Economic/Aquatic/Tribal).
19. **Biophysical/Tribal Priority** – The Upper Malheur subbasin is the only subbasin in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of (1) terrestrial old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes, which would promote tribal cultural and traditional uses and would be directed towards providing economic benefits to tribal communities. The emphases would be (1)



silvicultural treatments in the dry and moist forest; (2) altering livestock grazing strategies in the dry grass and dry shrub potential vegetation groups (PVGs); (3) noxious weed control in the dry forest, dry grass, and dry shrub PVGs; (4) reducing adverse road effects in the dry forest, moist forest, and dry shrub PVGs; and (5) prescribed fire in the dry, cold, and moist forest PVGs and the dry and cool shrub PVGs. Prescribed fire and restoration of aquatic-riparian condition/hydrologic processes would be above base levels. Other activity levels should be at or above base levels.

20. **Economic/Tribal Priority** — The Lower Clark Fork and the Middle Snake-Succor are the two subbasins in this category for Alternatives S2 and S3. Management activities would be expected to provide economic benefits to tribal communities and other isolated and economically specialized communities. The emphases would be (1) silvicultural treatments in the dry and moist forest PVGs; (2) noxious weed control in the dry forest, dry grass, and dry shrub PVGs; and (3) prescribed fire in the dry and cool shrub PVGs and the dry, moist, and cold forest PVGs. Prescribed fire and noxious weed control would be at higher than base levels.

21. **Aquatic/Tribal Priority** — The Lower Deschutes, Clearwater, and Salt subbasins are the three subbasins in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of aquatic and riparian habitats as well as provide economic benefits to tribal communities. The emphases would be (1) silvicultural treatments in the dry and moist forest PVGs; (2) noxious weed control in the dry grass and dry shrub PVGs; (3) reducing adverse road effects in the dry forest, moist forest, dry shrub, and cool shrub PVGs; (4) altering livestock grazing strategies in the dry grass and dry shrub PVGs; (5) prescribed fire in dry and cool shrub PVGs and the dry, moist, and cold forest PVGs; and (6) restoration of aquatic-riparian condition/hydrologic processes in all PVGs. The expectation is that restoration of aquatic-riparian condition/hydrologic processes and reducing adverse road effects would be greater than base level and other restoration activities would be equal to or higher than base level.

22. **Biophysical Priority** — The Upper Crooked, Trout, Lower Snake-Tucannon, and Medicine Lodge subbasins are the four subbasins in this

category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of (1) terrestrial old-forest and/or rangeland source habitats, (2) aquatic and riparian habitats, and (3) water quality and hydrological processes, in an integrated fashion. The emphases would be on silvicultural treatments, altering livestock grazing management strategies, noxious weed control, reducing adverse road effects, prescribed fire, and restoration of aquatic-riparian condition/hydrologic processes, which indicates that there is no single emphasis but rather higher rates of restoration activities.

23. **Economic Priority** — The Lake Abert, Pend Oreille, and Upper Kootenai subbasins are the three subbasins in this category for Alternative S2. In addition to those subbasins, the Yaak, Moyie, Idaho Falls, Big Lost, Boise-Mores, and Lower Malheur subbasins constitute the nine subbasins in this category for Alternative S3. Management activities would be expected to provide economic benefits to isolated and economically specialized communities. There would be greater emphasis on silvicultural treatments, prescribed fire, and noxious weed control. Other restoration activities would be near base levels.

24. **Aquatic Priority** — The Swan, Upper North Fork Clearwater, Lochsa, Lower Selway, Lower Salmon, Little Salmon, South Fork Salmon, Upper Salmon, Pahsimeroi, South Fork Boise, Palisades, Walla Walla, and Upper Yakima subbasins are the 13 subbasins in this category for Alternatives S2 and S3. Management activities would be expected to stimulate restoration of aquatic and riparian resources. The emphases would be on restoration of aquatic-riparian condition/hydrologic processes and reducing adverse road effects. Opportunities for other types of restoration are low and related activities would be near base levels.

25. **Tribal Priority** — The Sanpoil and Priest subbasins are the two subbasins in this category for Alternative S2. In addition to those subbasins, the Lower Kootenai, North Fork Flathead, Upper Spokane, Sprague, and Blackfoot subbasins constitute the seven subbasins in this category for Alternative S3. Management activities would be expected to stimulate restoration of the biophysical resources that will promote tribal cultural and traditional uses, as well as provide economic



benefits to tribal communities. In general, all restoration activity levels would be above base level. The emphases would be (1) silvicultural treatments in the dry and moist forest PVGs; (2) noxious weed control in the dry forest, cool shrub, dry shrub, and dry grass PVGs; (3) reducing adverse road effects in the dry, cold, and moist forest PVGs; (4) altering livestock grazing management strategies in the cool shrub, dry shrub, and dry grass PVGs; and (5) prescribed fire in all PVGs.

26. **Base level** — All other areas not covered in categories #1–25 above.

## Restoration Management Activities

In this EIS, reference to restoration management activities in general refers to one or more of the following in the list below. The probabilities of implementation and the rate of application (see definitions below) of these restoration management activities are shown for each of six potential vegetation groups (PVGs) in storyline tables at the end of this document.

**Timber harvest and silvicultural treatments** — Includes mechanical forest activities such as harvest, commercial and precommercial thinning, and planting. These activities may produce commercially marketable wood products.

**Rangeland management** — The EIS team interpreted this as primarily “altered livestock grazing management strategies.” As the rate of application grades from High to None in the storyline tables, the EIS Team interpreted it as grading from a high level of altered livestock grazing management strategies to no change in currently administered livestock grazing management strategies. Thus, rangeland health improvements are more likely to be detected as the rate of application grades from None to High rangeland management; the more management, the more improvement. The premise is that when livestock grazing management strategies are altered, they are altered because there is a need to reduce negative ecological effects attributable to excessive livestock grazing pressure.

In the landscape modeling of vegetation and disturbances, as the rate of rangeland management grades from High to None, livestock grazing more likely causes successional change in vegetation. This successional change in vegetation is typically a reflection of negative ecological effects and a decline in rangeland health. The probabilities associated with ‘successional change grazing’ and ‘successional accelerating grazing’ would increase in the landscape modeling as rate of application for rangeland management grades from High to None. (See Keane et al. 1996 for explanation of ‘successional change grazing’ and ‘successional accelerating grazing’.)

**Noxious weed control** — As the rate of application grades from None to High in the storyline tables, the EIS Team interpreted it as a greater degree of noxious weed control. In the landscape modeling of vegetation and disturbances, as the rate for noxious weed control grades from None to High, probabilities associated with ‘herbicide application’ and ‘seeding native plants’ would increase; this also reflects a greater degree of noxious weed control. (See Keane et al. 1996 for explanation of ‘herbicide application’ and ‘seeding native plants’.)

**Reduction in adverse road effects** — Includes actions designed to reduce the adverse effects of roads on hydrologic processes and aquatic and terrestrial species. Activities include road maintenance, seasonal closure, and obliteration.

**Prescribed fire** (includes planned and unplanned ignitions) — Includes actions designed to restore/maintain rangeland and forest vegetation composition and structure. Activities include prescribed fire and “wildland fire use for resource benefit” (formerly known as prescribed natural fire).

**Aquatic-Riparian Condition/Hydrologic processes** — Includes actions designed to restore water quality and riparian areas. Activities include seedings and plantings, to re-establish ground cover or riparian vegetative structure, so that gully erosion can be reduced, soil compaction can be reduced, and degraded or channelized streams can be reconnected to their floodplains.



# Probabilities of Implementation

These are the probabilities of the activity occurring or being implemented in the first decade after the Record of Decision is signed, based on management intent, management direction, and the management hierarchy.

None:	0
Very Low:	1-4 percent
Low:	5-33 percent
Moderate:	34-66 percent
High:	67-100 percent

# Rate of Application

This is the probable rate of application of the restoration activity, based on the management intent, management direction, and restoration priorities. These rates of application are qualitative and are relative to each other. These qualitative rates of application translate most directly to quantitative probabilities of disturbance applied to individual pixels within the landscape modeling of vegetation and disturbances. (See page 6 of Keane et al. 1996 for more detail on simulation of disturbances.)

None
Low
Moderate
High

# Assumptions

The EIS Team made the following assumptions in the spring of 1999 in developing the storylines. These assumptions also were developed to help the SAG understand how the EIS team interpreted management intent, management direction, and the management hierarchy, so that SAG could model the effects of the alternatives.

## General Assumptions

Rates of application for silvicultural treatments and prescribed fire will be slowed where there is a complexity of resource issues. For example, in subbasins

where there are numerous restoration priorities, there will be more need for Ecosystem Analysis at the Watershed Scale (EAWS). The rates of application for silvicultural treatments and prescribed fire would be increased under Alternative S3 compared to Alternatives S2 and S1.

The rate of application for prescribed fire is slowed slightly in areas where there is greater emphasis on timber harvest for economic reasons; for example, in subbasins that have an Economic restoration priority.

An Economic and/or Tribal restoration priority trend the rate of application upward for noxious weed control.

An Aquatic restoration priority reduces the probability of implementation and the rate of application of silvicultural treatments, prescribed fire, and noxious weed control, while increasing the same for range management, reduction of adverse road effects, and aquatic-riparian condition/hydrologic processes.

A Tribal restoration priority trends the rate of application upward for silvicultural treatments and prescribed fire.

A1 subwatersheds and T watersheds trend the probability of implementation upward for noxious weed control because there is high priority in the management direction to maintain and secure these aquatic strongholds and terrestrial source habitats from noxious weed invasion and spread. However, the rates of application will be low because A1 subwatersheds and T watersheds should be relatively noxious weed-free.

The A2 subwatersheds *inside* high restoration priority subbasins typically were rated higher for probability of implementation and rate of application for noxious weed control, silvicultural treatments, and prescribed fire, compared with A2 subwatersheds *outside* high restoration priority subbasins. The same distinction between inside and outside high restoration priority subbasins will hold for RCAs, unroaded areas, and old forest.

Base level areas typically will have a lower probability of implementation and rate of application for silvicultural treatments, range management, prescribed fire, and noxious weed control compared with areas within high restoration priority subbasins.

There was intent to trend probability of implementation and rate of application downward for noxious weed control in unroaded areas because of lack of access.



Restoration of aquatic-riparian condition/hydrologic processes in the urban-rural-wildland interface areas (URWI) will be of similar probability of implementation and rate of application as in base level areas.

Range management, noxious weed control, silvicultural treatments, and prescribed fire in the urban-rural-wildland interface areas will have a higher probability of implementation and rate of application than in base level areas.

Reducing adverse road effects in the urban-rural-wildland interface areas will have a lower probability of implementation and rate of application than in base level areas.

## Dry Forest PVG Assumptions

A Tribal restoration priority increases the probability of implementation and rate of application slightly for prescribed fire and silvicultural treatments.

The dry forest PVG will have a lower probability of implementation and rate of application for noxious weed control compared to the dry grass PVG, but will be higher compared to the moist forest PVG.

The dry forest PVG will have a lower probability of implementation and rate of application for rangeland management compared to the dry grass PVG, but will be slightly higher compared to the moist forest PVG.

The Dry forest PVG is likely to see the highest probability of implementation and rate of application of prescribed fire because its resource conditions are the most departed, or most different from the historical range of variability.

Probabilities of implementation and rates of application for silvicultural treatments are likely to be highest in the dry and Moist forest PVGs because the dry forest is most departed and the highest management priority. Moist forest is the most productive forest PVG and will require more silvicultural treatments compared to fire; that is, the proportion of silvicultural treatments to prescribed fire will be higher in moist forest and lower in dry forest.

For the 40 High restoration priority subbasins in Alternative S2, probabilities of implementation are generally high for silvicultural treatments, prescribed fire, and noxious weed control. Therefore there is a high likelihood that these activities will be conducted within the first 10 years after the ROD is signed and it

is the rate that will vary comparatively more. The exception to this is in the subbasins with high Aquatic priority, where the focus is more on the aquatic portion of the subbasin and there is less need for high probabilities of implementation and high rates of application for the above-mentioned restoration activities.

## Moist Forest PVG Assumptions

The Moist forest PVG is likely to have lower probability of implementation and rate of application of prescribed fire than the dry forest PVG because fire regimes are most departed in dry forest (that is, most different from the historical range of variability).

Silvicultural treatments are likely to have similar probabilities of implementation and rates of application in moist and dry forest PVGs because dry forest is most departed and moist forest is most productive, leading to an expected "leveling effect".

The moist forest PVG is likely to see a higher probability of implementation and rate of application for silvicultural treatments and prescribed fire than cold forest because moist forest is more departed and has a higher priority for restoration.

The moist forest PVG will have more emphasis on commercial thinning (harvest) and dry forest will have more emphasis on precommercial thinning because the moist forest is more productive, producing larger trees, faster.

The moist forest PVG will have a lower probability of implementation and rate of application for noxious weed control than dry forest and higher than cold forest. These differences are attributable to differential susceptibilities of these PVGs to invasion by noxious weeds.

The moist forest PVG will have a lower probability of implementation and rate of application for rangeland management than dry forest and higher than cold forest.

## Cold Forest PVG Assumptions

In the cold forest PVG, silvicultural treatments are not expected in MAC1 areas, A1 subwatersheds, or T



watersheds because most of these areas are within designated wilderness areas.

In the cold forest PVG, there is a much lower emphasis on silvicultural treatments and a slightly lower emphasis on prescribed fire, compared to Moist forest because cold forest is less departed (less different from the historical range of variability).

## **Dry Grass PVG Assumptions**

No timber harvest will occur in the dry grass PVG. Management direction does permit some harvest of timber (ponderosa pine and Douglas-fir, for example) in dry grass, particularly where trees have encroached into dry grass because of fire suppression, excessive livestock grazing pressure, and other activities. However, it did not seem possible to translate this into specific pixels where management prescriptions could be applied.

There will be generally low incidence of prescribed fire in dry grass because fire increases the risk of invasion and establishment of noxious weeds and other exotic undesirable plants (such as cheatgrass). Dry grass is the PVG most susceptible to invasion by noxious weeds and other exotic undesirable plants.

There will generally be a higher incidence of prescribed fire inside high restoration priority subbasins.

No old forest is assumed to be present within the dry grass PVG.

The probability of implementation and rate of application for noxious weed control are higher in the dry grass PVG than in the dry shrub PVG.

## **Dry Shrub PVG Assumptions**

The probability of implementation and rate of application for noxious weed control are higher in the dry shrub PVG than in the cool shrub PVG. In general, dry shrub sustains a greater susceptibility to noxious weed invasion and spread compared to cool shrub.

The probability of implementation and rate of application for prescribed burning are greater in the dry shrub PVG compared to dry grass.

No timber harvest will occur in the dry shrub PVG. Management direction does permit some harvest of timber (western juniper, for example) in dry shrub, particularly where woodlands have encroached into dry shrub because of fire suppression, excessive livestock grazing pressure, and other activities. However, it did not seem possible to translate this into specific pixels where management prescriptions could be applied.

## **Cool Shrub PVG Assumptions**

The cool shrub PVG generally has the highest probability of implementation and rate of application for prescribed fire among rangeland PVGs because cool shrub is a relatively productive PVG where shrub and/or herbaceous fuel loads accumulate more rapidly and where historical fire frequency was relatively more frequent.

The cool shrub PVG has the lowest probability of implementation and rate of application for noxious weed control because cool shrub (compared to dry grass and dry shrub) is least susceptible to noxious weed invasion and spread.

No timber harvest will occur in the cool shrub PVG. Management direction does permit some harvest of timber (Douglas-fir, for example) in cool shrub, particularly where forest has encroached into cool shrub because of fire suppression, excessive livestock grazing pressure, and other activities. However, it did not seem possible to translate this into specific pixels where management prescriptions could be applied.

# Management Prescriptions to Simulate the Alternatives

The following management prescription sets were used to model the Supplemental Draft EIS alternatives. These recommended prescriptions are referenced in Tables 1–6, later in this section.

- H1** Prescription set to model 100-year and 400-year simulations of HRV.

## *Ecological Restoration Prescriptions*

- A1** Prescription set with moderate levels of ecological restoration. Generally designed for areas that have moderate departure from HRV, in areas with road access.
- A2** Prescription set with moderate levels of ecological restoration. Generally designed for areas that have moderate departure from HRV, in areas with road access.
- A3** Prescription set with moderate levels of ecological restoration. Generally designed for areas that have high departure from HRV, in areas with road access.
- N1** Prescription set with low levels of ecological restoration. Generally designed for maintenance of areas that have low departure from HRV.
- N4** Prescription set with low levels of ecological restoration, typically for use in visually sensitive areas or where the objective has mixed traditional and ecological restoration objectives. Generally designed for areas that have low departure from HRV.

## *Traditional Reserve Management Prescriptions (Wilderness and Semi-primitive Roadless Areas)*

- C1** Prescription set for traditional wilderness, park, and semi-primitive area management with minimal ecological mitigation.
- N6** Prescription set for traditional wilderness and semi-primitive area management with minimal ecological mitigation.

- P1** Prescription set for traditional reserve management with low probability of successful wildfire suppression.

## *Traditional Commodity Management Prescriptions*

- C2** Prescription set for traditional commodity and resource value production at high levels with some ecological mitigation.
- C3** Prescription set for traditional commodity and resource value production at high levels with no ecological mitigation.
- N3** Prescription set for traditional commodity and resource value production at moderate levels and some ecological mitigation with higher livestock grazing than N8, and low probability of successful wildfire suppression.
- N5** Prescription set for moderate level traditional commodity and resource value production with low emphasis on exotic weed control on rangeland.
- N8** Prescription set for traditional commodity and resource value production at moderate levels and some ecological mitigation.
- P3** Prescription set for traditional commodity and resource value production at very high levels with no ecological mitigation.

## *Traditional Management in Visually or Environmentally Sensitive Areas Prescriptions*

- N2** Prescription set for moderate level traditional commodity and resource value production in visually sensitive areas with somewhat higher livestock grazing than N7 and minimal ecological mitigation.
- N7** Prescription set for moderate level traditional commodity and resource value production in visually sensitive areas with minimal ecological mitigation.
- P2** Prescription set for minimal levels of management in visually sensitive areas with no ecological mitigation and low probability of successful wildfire suppression.



Table 1. Dry Forest PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N	prob: L rate: L	prob: L rate: L	prob: VL rate: L	prob: L rate: L	prob: VL rate: L	N1, C1, N6, A1, P1
2	A1	prob: VL rate: L	prob: H rate: L	prob: H rate: L	prob: M rate: L	prob: VL rate: L	prob: L rate: L	N4, A1, C1, N6
3	T	prob: VL rate: L	prob: H rate: L	prob: H rate: L	prob: M rate: L	prob: L rate: L	prob: VL rate: L	N4, A1, C1, N6
4	URWI	prob: H rate: M	prob: L/M rate: L/M	prob: M/H rate: ML	prob: L/M rate: L	prob: H rate: M/H	prob: M rate: L/M	A2, A3
5	A2 outside HRP	prob: L rate: L	prob: M rate: L	prob: M rate: L/M	prob: H rate: M	prob: L rate: L/M	prob: H rate: M	N4, C1, N6, A1
6	RCAs outside HRP	prob: L rate: L	prob: L/M rate: M	prob: L/M rate: L	prob: H rate: M	prob: L rate: L	prob: M rate: L	N4, P1
7	Unroaded outside HRP	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: VL rate: L	prob: L rate: M	prob: VL rate: L	N4, N1, A1, C1, N6, P1
8	Old Forest outside HRP	prob: L rate: L/M	prob: L rate: L	prob: L/M rate: L	prob: H rate: M	prob: L rate: L/M	prob: VL rate: L	N4, N2, N7
9	A2 inside HRP	prob: H rate: L/M	prob: M rate: L/M	prob: H rate: L/M	prob: H rate: H	prob: H rate: L/M	prob: H rate: H	N4, C1, N6, A2, N2, N7
10	RCAs inside HRP	prob: M rate: L	prob: M rate: M	prob: M rate: L/M	prob: H rate: H	prob: M rate: L/M	prob: H rate: L/M	N4, C1, N6, A1
11	Unroaded inside HRP	prob: L/M rate: L/M	prob: L rate: L	prob: L rate: L	prob: VL rate: L	prob: M rate: M	prob: VL rate: L	N4, N7, A1
12	Old forest inside HRP	prob: M rate: M	prob: L rate: L	prob: M rate: L/M	prob: H rate: M	prob: M rate: M	prob: VL rate: L	N4, A2

Table 1. Dry Forest PVG Storyline (continued)

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/ Econ/ Aq/Tr	prob: H rate: M	prob: M rate: L/M	prob: H rate: M	prob: H rate: H	prob: H rate: M	prob: H rate: M	A2
14	Bio/Econ/ Aq	prob: H rate: M	prob: M rate: L/M	prob: H rate: M	prob: H rate: H	prob: H rate: M	prob: H rate: M	A2
15	Bio/Econ/ Tr	prob: H rate: H	prob: M rate: L	prob: H rate: M/H	prob: H rate: M	prob: H rate: M	prob: H rate: M	A3
16	Bio/Aq/ Tr	prob: H rate: M	prob: M rate: M/L	prob: H rate: M	prob: H rate: H	prob: H rate: M	prob: H rate: H	A2
17	Bio/Econ	prob: H rate: H	prob: M rate: L	prob: H rate: M/H	prob: H rate: H/M	prob: H rate: M	prob: H rate: M	A3
18	Bio/Aq	prob: H rate: M	prob: M rate: M/L	prob: H rate: M	prob: H rate: H	prob: H rate: M	prob: H rate: H	A2
19	Bio/Tr	prob: H rate: H	prob: M rate: L/M	prob: H rate: M/H	prob: H rate: H	prob: H rate: H	prob: H rate: H	A3
20	Econ/Tr	prob: H rate: H	prob: M rate: L	prob: H rate: M/H	prob: M rate: L	prob: H rate: M	prob: M rate: L	A3
21	Aq/Tribal	prob: H rate: M	prob: M rate: M/L	prob: H rate: M	prob: H rate: H	prob: H rate: M	prob: H rate: H	A2
22	Biophys	prob: H rate: H	prob: M rate: L/M	prob: H rate: M/H	prob: H rate: H	prob: H rate: H	prob: H rate: H	A2
23	Economic	prob: H rate: H	prob: M rate: L/M	prob: H rate: M/H	prob: M rate: L	prob: H rate: M	prob: M rate: L/M	A3
24	Aquatic	prob: M rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: H	prob: M rate: L	prob: H rate: H	N4,A2
25	Tribal	prob: H rate: H	prob: M rate: L	prob: H rate: M/H	prob: H rate: H	prob: H rate: H	prob: M rate: M	A3
26	Base level	prob: M rate: L/M	prob: L rate: L	prob: M rate: M/L	prob: M rate: L	prob: M rate: M	prob: M rate: L/M	higher rate of Rx fire& thinning and slightly more aq/hydro rest. than S1.

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban-Rural-Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



Table 2. Moist Forest PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N	prob:L rate: L	prob: VL rate: L	prob: VL rate: L	prob: L rate: L	prob:VL rate: L	N, C1, N6 A1, P1
2	A1	prob: VL rate: L	prob: M rate: L	prob: M rate: L	prob: M rate: L	prob: VL rate: L	prob: L rate: L	N4, A1, C1, N6
3	T	prob: VL rate: L	prob: M rate: L	prob: M rate: L	prob: M rate: L	prob: L rate: L	prob: VL rate: L	N4, A1, C1, N6
4	URWI	prob: H rate: M/H	prob: L/M rate: L/M	prob: M rate: L	prob: L rate: L	prob: H rate: M	prob: M rate: L/M	A3 ,A2, N7
5	A2 outside HRP	prob: L rate: L	prob:L/M rate: L	prob: L/M rate: L	prob: H rate: M	prob: L rate: L/M	prob: H rate: M	N4, C1, N6, A1
6	RCAs outside HRP	prob: L rate: L	prob:L rate: L	prob: L/M rate: L	prob: H rate: M	prob: L rate: L	prob:M rate: L	N4, P1
7	Unroaded outside HRP	prob: L rate: L	prob:L rate: L	prob: L rate: L	prob: VL rate: L	prob: L rate: M	prob: VL rate: L	N4, N1, A 1, C1, N6, P1
8	Old Forest outside HRP	prob: L rate: M	prob:L rate: L	prob:L/M rate: L	prob: H rate: M	prob: L rate: L/M	prob: VL rate: L	N4,N2, N7
9	A2 inside HRP	prob: H rate: L/M	prob:L/M rate: L	prob: M rate: L	prob: H rate: H	prob: H rate: L/M	prob:H rate: H	N4, C1,N6, A2, N2, N7
10	RCAs inside HRP	prob: M rate: L	prob:L/M rate: L	prob: M rate: L	prob: H rate: H	prob: M rate: L/M	prob: H rate: L/M	N4,C1,N6,A1
11	Unroaded inside HRP	prob: L/M rate: L/M	prob:L rate: L	prob: L rate: L	prob: VL rate: L	prob: M rate: M	prob: VL rate: L	N4, N7, A1
12	Old forest inside HRP	prob: M rate: M	prob:L rate: L	prob: M rate: L	prob: H rate: M	prob: M rate: M	prob: VL rate: L	N4, A2

**Table 2. Moist Forest PVG Storyline (continued)**

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/Econ/ Aq/Tr	prob: H rate: M	prob: L/M rate: L	prob: M rate: L/M	prob: H rate: M	prob: H rate: L/M	prob: H rate: M	A2,N7
14	Bio/Econ/ Aq	prob: H rate: M	prob: L/M rate: L	prob: M rate: L/M	prob: H rate: M	prob: H rate: L/M	prob: H rate: M	A2,N7
15	Bio/Econ/ Tr	prob: H rate: M	prob: L/M rate: L	prob: M rate: M	prob: H rate: H	prob: H rate: L/M	prob: H rate: M	A3,A2, N7
16	Bio/Aq/ Tr	prob: H rate: M	prob: L/M rate: L	prob: M rate: L/M	prob: H rate: H	prob: H rate: L/M	prob: H rate: H	A2,N7
17	Bio/Econ	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: H rate: H	prob: H rate: L/M	prob: H rate: M	A3,A2, N7
18	Bio/Aq	prob: H rate: M	prob: L/M rate: L	prob: M rate: L/M	prob: H rate: M	prob: H rate: L/M	prob: H rate: H	A2,N7
19	Bio/Tr	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: H rate: M	prob: H rate: M	prob: H rate: H	A3,A2, N7
20	Econ/Tr	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: M	prob: M rate: L	A3,A2, N7
21	Aq/Tribal	prob: H rate: M	prob: L/M rate: L	prob: M rate: L/M	prob: H rate: H	prob: H rate: M	prob: H rate: H	A2,N7
22	Biophys	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: H rate: M	prob: H rate: M	prob: H rate: H	A2,N7
23	Economic	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: M rate: M	prob: H rate: L/M	prob: M rate: L/M	A3,A2, N7
24	Aquatic	prob: M rate: L	prob: M rate: L	prob: L/M rate: L	prob: H rate: H	prob: M rate: L	prob: H rate: H	N4,N7
25	Tribal	prob: H rate: H	prob: L/M rate: L	prob: M rate: M	prob: H rate: H	prob: H rate: M/H	prob: M rate: M	A3,A2, N7
26	Base level	prob: M rate: M	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: M rate: L/M	prob: M rate: L/M	higher silv and lower Rx fire rate than dry forest, slightly more aq/hydro rest. than S1.

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban–Rural–Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



Table 3. Cold Forest PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N	prob: VL rate: L	prob: VL rate: L	prob: VL rate: L	prob: L rate: L	prob: VL rate: L	N1,C1, N6, P1
2	A1	prob: N rate: N	prob: M rate: L	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: L rate: L	N1, N4, C1, N6
3	T	prob: N rate: N	prob: M rate: L	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: VL rate: L	N1, N4, C1, N6
4	URWI	prob: M rate: L/M	prob: L/M rate: L/M	prob: L/M rate: L/M	prob: L rate: L	prob: M rate: M	prob: M rate: L/M	N7, A1, A2
5	A2 outside HRP	prob: VL rate: L	prob: L rate: L	prob: L rate: L	prob: M rate: M	prob: L rate: L	prob: H rate: M	N4, C1, N6,
6	RCAs outside HRP	prob: VL rate: L	prob: L rate: L	prob: L rate: L	prob: M rate: M	prob: L rate: L	prob: M rate: L	N4, P1
7	Unroaded outside HRP	prob: VL rate: L	prob: VL rate: L	prob: L rate: L	prob: VL rate: L	prob: L rate: L	prob: VL rate: L	N4,N1,C1, N6,P1
8	Old Forest outside HRP	prob: L rate: L/M	prob: VL rate: L	prob: L rate: L	prob: M rate: L	prob: L rate: L	prob: VL rate: L	N4,N1
9	A2 inside HRP	prob: L/M rate: L	prob: M rate: L	prob: L/M rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: H	N4, C1, N6, N7
10	RCAs inside HRP	prob: L rate: L	prob: L/M rate: L	prob: L/M rate: L	prob: M rate: M	prob: L/M rate: L	prob: H rate: L	N4,C1,N6,
11	Unroaded inside HRP	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: VL rate: L	prob: L/M rate: L/M	prob: VL rate: L	N4, N1
12	Old forest inside HRP	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: L/M rate: L/M	prob: VL rate: L	N4

Table 3. Cold Forest PVG Storyline (continued)

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/Econ/ Aq/Tr	prob: L/M rate: L	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: H rate: L	prob: H rate: L	N4
14	Bio/Econ/ Aq	prob: L/M rate: L	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: H rate: L	prob: H rate: L	N4
15	Bio/Econ/ Tr	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: M	prob: H rate: L	N4, A1
16	Bio/Aq/ Tr	prob: L/M rate: L	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: H rate: L/M	prob: H rate: M	N4
17	Bio/Econ	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: L	prob: H rate: L	N4, A1, N7
18	Bio/Aq	prob: L/M rate: L	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: H rate: L	prob: H rate: M	N4
19	Bio/Tr	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: M	prob: H rate: M	N4, A1
20	Econ/Tr	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: L/M	prob: M rate: L	N4, A1
21	Aq/Tribal	prob: L/M rate: L	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: M	prob: H rate: L/M	prob: H rate: M	N4
22	Biophys	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: L/M	prob: H rate: M	N4
23	Economic	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L	prob: H rate: L	prob: M rate: L	N4, A1
24	Aquatic	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: M rate: M	prob: L rate: L	prob: H rate: M	N4
25	Tribal	prob: L/M rate: L/M	prob: L rate: L	prob: L/M rate: L/M	prob: H rate: H	prob: H rate: M	prob: M rate: L	N4, A1
26	Base level	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: L rate: L	prob: L/M rate: L/M	prob: M rate: L/M	a lower activity rate for all activities compared to the moist forest Rx.

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban-Rural-Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



Table 4. Dry Grass PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N	prob: L rate: L	prob: M rate: L	prob: VL rate: L	prob: VL rate: L	prob: VL rate: L	N6
2	A1	prob: N rate: N	prob: M rate: L	prob: H rate: L	prob: M rate: L	prob: VL rate: L	prob: L rate: L	N6
3	T	prob: N rate: N	prob: M rate: L	prob: H rate: L	prob: M rate: L	prob: L rate: L	prob: VL rate: L	N6
4	URWI	prob: N rate: N	prob: M/H rate: L/M	prob: M/H rate: M/H	prob: L rate: L	prob: L rate: L/M	prob: M rate: L/M	A3, C3
5	A2 outside HRP	prob: N rate: N	prob: M rate: L	prob: M rate: L/M	prob: H rate: M	prob: L rate: L	prob: H rate: M	N1, A1
6	RCAs outside HRP	prob: VL rate: L	prob: M rate: L	prob: L/M rate: L	prob: H rate: M	prob: L rate: L/M	prob: M rate: L	N4, N1
7	Unroaded outside HRP	prob: N rate: N	prob: M rate: L	prob: M rate: L	prob: VL rate: L	prob: L rate: M	prob: VL rate: L	A1
8	Old Forest outside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	N/A
9	A2 inside HRP	prob: N rate: N	prob: H rate: M	prob: H rate: L/M	prob: H rate: H	prob: L rate: L/M	prob: H rate: H	A1, N1
10	RCAs inside HRP	prob: VL rate: L	prob: H rate: M	prob: M rate: L/M	prob: H rate: H	prob: L rate: L/M	prob: H rate: M	N1
11	Unroaded inside HRP	prob: N rate: N	prob: H rate: M	prob: M rate: L/M	prob: VL rate: L	prob: L/M rate: M	prob: VL rate: L	A1
12	Old forest inside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	N/A

Table 4. Dry Grass PVG Storyline (continued)

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/Econ/ Aq/Tr	prob: N rate: N	prob: H rate: M	prob: H rate: M/H	prob: M rate: M	prob: M rate: L/M	prob: H rate: M	A3
14	Bio/Econ/ Aq	prob: N rate: N	prob: H rate: M	prob: H rate: M/H	prob: H rate: H	prob: M rate: L	prob: H rate: M	A3,N1
15	Bio/Econ/ Tr	prob: N rate: N	prob: H rate: L	prob: H rate: H	prob: L rate: L	prob: M rate: M	prob: H rate: M	A3,C3
16	Bio/Aq/ Tr	prob: N rate: N	prob: H rate: M	prob: H rate: M/H	prob: L rate: L	prob: M rate: M	prob: H rate: H	A3
17	Bio/Econ	prob: N rate: N	prob: H rate: L	prob: H rate: H	prob: M rate: M	prob: M rate: L/M	prob: H rate: M	A3,C3
18	Bio/Aq	prob: N rate: N	prob: H rate: M	prob: H rate: M/H	prob: L rate: L	prob: M rate: L/M	prob: H rate: H	A3
19	Bio/Tr	prob: N rate: N	prob: H rate: M	prob: H rate: H	prob: L rate: L	prob: M rate: M/H	prob: H rate: H	A3
20	Econ/Tr	prob: N rate: N	prob: M rate: L	prob: H rate: H	prob: M rate: M	prob: M rate: M	prob: M rate: L	A3,C2
21	Aq/Tribal	prob: N rate: N	prob: H rate: M	prob: H rate: M	prob: M rate: M	prob: M rate: M	prob: H rate: H	A3
22	Biophys	prob: N rate: N	prob: H rate: M	prob: H rate: H	prob: M rate: M	prob: M rate: M	prob: H rate: H	A3
23	Economic	prob: N rate: N	prob: M rate: L	prob: H rate: H	prob: L rate: L	prob: M rate: L/M	prob: M rate: L/M	A3,C2
24	Aquatic	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: H rate: H	prob: L rate: L	prob: H rate: H	A3,N1
25	Tribal	prob: N rate: N	prob: H rate: L	prob: H rate: H	prob: L rate: L	prob: M rate: M/H	prob: M rate: M	A3,C2
26	Base Level	prob: N rate: N	prob: M rate: L	prob: M rate: M	prob: L rate: L	prob: L rate: L/M	prob: M rate: L/M	a higher rate of weed control over S1, shifting to more N7

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban–Rural–Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



Table 5. Dry Shrub PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N	prob: L rate: L	prob: M rate: L	prob: VL rate: L	prob: L rate: L/M	prob: VL rate: L	N6, A1
2	A1	prob: N rate: N:	prob: M rate: L	prob: H rate: L	prob: M rate: L	prob: L/M rate: M	prob: L rate: L	A1
3	T	prob: N rate: N	prob: M rate: L	prob: H rate: L	prob: M rate: L	prob: M rate: M	prob: VL rate: L	N6, A1
4	URWI	prob: N rate: N:	prob: M/H rate: L/M	prob: M rate: M	prob: M/L rate: M/L	prob: L/M rate: L	prob: M rate: L/M	N4, A3
5	A2 outside HRP	prob: N rate: N	prob: M rate: L	prob: M rate: L	prob: H rate: M	prob: L/M rate: L/M	prob: H rate: M	C1,C2
6	RCAs outside HRP	prob: VL rate: L	prob: M rate: L	prob: L rate: L	prob: H rate: M	prob: L/M rate: L/M	prob: M rate: L	N4, N1
7	Unroaded outside HRP	prob: N rate: N	prob: M rate: L	prob: M rate: L	prob: VL rate: L	prob: L/M rate: M	prob: VL rate: L	A1
8	Old Forest outside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	N/A
9	A2 inside HRP	prob: N rate: N	prob: H rate: M	prob: H rate: M	prob: H rate: H	prob: M rate: M	prob: H rate: H	A3
10	RCAs inside HRP	prob: VL rate: L	prob: H rate: M	prob: H rate: L/M	prob: H rate: H	prob: L rate: L/M	prob: H rate: M	N1
11	Unroaded inside HRP	prob: N rate: N	prob: H rate: M	prob: M rate: L/M	prob: VL rate: L	prob: L/M rate: M	prob: VL rate: L	A1
12	Old forest inside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	NA

Table 5. Dry Shrub PVG Storyline (continued)

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/Econ/ Aq/Tr	prob: N rate: N	prob: H rate: M	prob: M/H rate: M	prob: M rate: M	prob: H rate: M	prob: H rate: M	A3
14	Bio/Econ/ Aq	prob: N rate: N	prob: H rate: M	prob: M/H rate: M	prob: H rate: H	prob: H rate: L/M	prob: H rate: M	A3, N1
15	Bio/Econ/ Tr	prob: N rate: N	prob: H rate: L	prob: M/H rate: M/H	prob: M rate: L	prob: H rate: M	prob: H rate: M	A3,C2
16	Bio/Aq/ Tr	prob: N rate: N	prob: H rate: M	prob: M/H rate: M	prob: M rate: M	prob: H rate: M	prob: H rate: H	A3, A2
17	Bio/Econ	prob: N rate: N	prob: H rate: L	prob: M/H rate: M/H	prob: H rate: H	prob: H rate: L/M	prob: H rate: M	A3,C2
18	Bio/Aq	prob: N rate: N	prob: H rate: M	prob: M/H rate: M	prob: H rate: H	prob: H rate: L/M	prob: H rate: H	A3, A2
19	Bio/Tr	prob: N rate: N	prob: H rate: M	prob: M/H rate: M/H	prob: H rate: H	prob: H rate: M/H	prob: H rate: H	A2
20	Econ/Tr	prob: N rate: N	prob: M rate: L	prob: M/H rate: M/H	prob: H rate: M	prob: H rate: M	prob: M rate: L	C2, N7
21	Aq/Tribal	prob: N rate: N	prob: H rate: L/M	prob: M/H rate: M	prob: H rate: M/H	prob: H rate: M	prob: H rate: M/H	A3, A2
22	Biophys	prob: N rate: N	prob: H rate: M	prob: M/H rate: M/H:	prob: H rate: H	prob: H rate: M	prob: H rate: H	A2
23	Economic	prob: N rate: N	prob: M rate: L	prob: M/H rate: M/H	prob: M rate: M	prob: H rate: L/M	prob: M rate: L/M	C2, N7
24	Aquatic	prob: N rate: N:	prob: M rate: M	prob: M/L rate: L	prob: H rate: H	prob: L rate: L	prob: H rate: H	A3, N4
25	Tribal	prob: N rate: N:	prob: H rate: L	prob: M/H rate: M/H:	prob: M rate: M	prob: H rate: M/H	prob: M rate: M	A3,C2
26	Base Level	prob: N rate: N:	prob: M rate: L	prob: M/L rate: M/L	prob: M rate: M	prob: L/M rate: L	prob: M rate: L/M	N2

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban–Rural–Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



Table 6. Cool Shrub PVG Storyline

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
1	MAC 1	prob: N rate: N:	prob: L rate: L	prob: L rate: L	prob: VL rate: L	prob: L/M rate: M	prob: VL rate: L	A3
2	A1	prob: N rate: N	prob: M rate: L	prob: M rate: L	prob: M rate: L	prob: L/M rate: M/H	prob: L rate: L	A3
3	T	prob: N rate: N	prob: M rate: L	prob: M rate: L	prob: M rate: L	prob: M rate: M	prob: VL rate: L	A3
4	URWI	prob: N rate: N	prob: L/M rate: L/M	prob: M rate: L/M	prob: L/M rate: L	prob: M/H rate: M	prob: M rate: L/M	A3
5	A2 outside HRP	prob: N rate: N	prob: M rate: L	prob: L/M rate: L	prob: M rate: L	prob: L/M rate: L/M	prob: H rate: M	A3
6	RCAs outside HRP	prob: VL rate: L	prob: M rate: L	prob: L rate: L	prob: M rate: L	prob: M rate: M	prob: M rate: L	N4, N1
7	Unroaded outside HRP	prob: N rate: N	prob: M rate: L	prob: L rate: L	prob: VL rate: L	prob: M rate: M/H	prob: VL rate: L	A3
8	Old Forest outside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	NA
9	A2 inside HRP	prob: N rate: N	prob: H rate: M	prob: M rate: L/M	prob: M rate: M	prob: M rate: M/H	prob: H rate: H	A2, A3
10	RCAs inside HRP	prob: VL rate: L	prob: H rate: M	prob: M rate: L	prob: M rate: M	prob: M rate: M	prob: H rate: M	A2, A3
11	Unroaded inside HRP	prob: N rate: N	prob: H rate: M	prob: L/M rate: L	prob: VL rate: L	prob: M rate: M/H	prob: VL rate: L	A2
12	Old forest inside HRP	prob: NA rate: NA	prob: NA rate: NA	prob: NA rate: NA	prob: VL rate: L	prob: NA rate: NA	prob: VL rate: L	NA

Table 6. Cool Shrub PVG Storyline (continued)

Cat	Area	Timber& Silvic.	Range Mgmt	Noxious Weed Control	Reduce Road Effects	Prescribed Fire	Aq/Hydr Restoration	EIS Team Recom. Prescrip.*
<i>High Restoration Priority Subbasins</i>								
13	Bio/Econ/ Aq/Tr	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: M rate: L	prob: H rate: M/H	prob: H rate: L	A2
14	Bio/Econ/ Aq	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: H rate: M	prob: H rate: M	prob: H rate: L	A3
15	Bio/Econ/ Tr	prob: N rate: N	prob: M rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: M	prob: H rate: L	A3,C3
16	Bio/Aq/ Tr	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: M rate: L	prob: H rate: M/H	prob: H rate: M	A2
17	Bio/Econ	prob: N rate: N	prob: M rate: L	prob: M rate: M	prob: H rate: M	prob: H rate: M	prob: H rate: L	A3,C3
18	Bio/Aq	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: M rate: L	prob: H rate: M	prob: H rate: M	A3
19	Bio/Tr	prob: N rate: N	prob: M rate: M	prob: M rate: M	prob: M rate: L	prob: H rate: H	prob: H rate: M	A2
20	Econ/Tr	prob: N rate: N	prob: L rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: M	prob: M rate: L	A3,C3
21	Aq/Tribal	prob: N rate: N	prob: M rate: M	prob: M rate: L/M	prob: M/H rate: L/M	prob: H rate: M	prob: H rate: M	A2
22	Biophys	prob: N rate: N	prob: M rate: M	prob: M rate: M	prob: H rate: M	prob: H rate: M	prob: H rate: M	A3
23	Economic	prob: N rate: N	prob: L rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: M	prob: M rate: L	A3,C3
24	Aquatic	prob: N rate: N	prob: L rate: M	prob: L rate: L	prob: H rate: M	prob: L rate: L	prob: H rate: M	A3,N4
25	Tribal	prob: N rate: N	prob: M rate: L	prob: M rate: M	prob: M rate: L	prob: H rate: H	prob: M rate: L	A2,C3
26	Base Level	prob: N rate: N	prob: L rate: L	prob: L/M rate: L	prob: M rate: L	prob: M rate: L/M	prob: M rate: L/M	N4,N2

\* For management prescription descriptions, see the Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives section, immediately preceding Table 1.

**Abbreviations used in this table:**

MAC1 = Management Area Category 1 (e.g., congressionally designated wilderness and wilderness study areas)

A1 = Aquatic A1 subwatersheds

A2 = Aquatic A2 subwatersheds

T = Terrestrial watersheds

URWI = Urban–Rural–Wildland interface areas

HRP = High restoration priority subbasins

RCA = Riparian Conservation Area

H = High; M = Moderate; L = Low; VL = Very low; N = None; NA = Not applicable.

Rx = Prescribed/prescription



# Funding Allocation to High Restoration Priority Subbasins in Alternatives S2 and S3

## Introduction

The EIS team prioritized 40 subbasins as high restoration priority subbasins for Alternative S2 and 51 subbasins as high restoration priority subbasins for Alternative S3. This prioritization was developed from five “functional” resource priority maps: (1) aquatic, (2) old forest/rangeland habitat, (3) water quality (aka hydrologic processes & water quality), (4) economic, and (5) tribal, which were integrated to varying degrees through use of a landscape restoration priority map. The majority of the high restoration priority subbasins in alternatives S2 and S3 were rated either moderate or high for landscape restoration priority. These subbasins provide a moderate to high opportunity to increase restoration effectiveness and efficiency by achieving restoration of multiple resource needs simultaneously in an integrated fashion across landscapes (that is, landscape restoration). Other high restoration priority subbasins, particularly some of those labeled for tribal restoration and aquatic restoration, show low opportunity for restoration of multiple resource needs simultaneously.

It is assumed that current budget allocations will be used as necessary to meet local (administrative unit) restoration priorities. Any additional funding originating from ICBEMP will be allocated for restoration and divided among the subbasins which were designated as high restoration priority subbasins. However, because each high restoration priority subbasin does not have the same complexity of restoration issues and needs, a method that takes account of the complexity was developed to allocate the additional funding originating from ICBEMP among the high restoration priority subbasins.

## Methodology: How Funding Allocation is Determined

### General Methods

The method of funding allocation for the high restoration priority subbasins was based on three general premises:

1. Subbasins that are rated High for landscape restoration priority will receive larger allocations because restoration efforts here should provide more effective and efficient results. Subbasins that are rated Moderate for landscape restoration priority will receive an intermediate level of allocation. Subbasins rated Low for landscape restoration priority will receive the smallest allocations.
2. Within each of the three general levels of allocation (High, Moderate, and Low landscape restoration priority), subdivision within these levels is based on the number of high ratings for the functional restoration priorities. Subbasins that contain the most High ratings will receive larger allocations because of possibly more complicated restoration needs that dictate more complicated planning of restoration activities and mitigation of the effects across multiple resources. This could lead to higher costs of analysis.
3. Within these subdivision levels, a second level of subdivision is based on acreage of BLM- and Forest Service-administered lands. The more acres of BLM- and Forest Service-administered lands within a subbasin, the higher the allocation for restoration.

In summary, general funding allocation was influenced by three factors, with landscape restoration priority being the most influential, functional restoration priority being intermediate in influence, and acreage of BLM- and Forest Service-administered lands being least influential.

## Specific Methods

1. The 40 high restoration priority subbasins for Alternative S2 and the 51 high restoration priority subbasins for Alternative S3 were sorted into three categories based on whether they were rated High, Moderate, or Low for landscape restoration priority (see columns 1 and 2 of Tables 7 and 8). For Alternative S2, this resulted in 18 subbasins rated High, 9 subbasins rated Moderate, and 13 subbasins rated Low; for Alternative S3, it resulted in 20 subbasins rated High, 13 subbasins rated Moderate, and 18 subbasins rated Low.
2. Within these three categories of High, Moderate, and Low from Step 1, subbasins were subdivided based on the number of High ratings they had for functional restoration priorities (that is, Aquatic, Old Forest/Rangeland Habitat, Water Quality, Economic, and Tribal). In this classification, a subbasin with a greater number of High ratings was placed in a higher subdivision than a subbasin with fewer High ratings (a few subbasins had no High ratings). This resulted in four subdivisions (subdivisions 1–4) for the High-rated subbasins, two subdivisions (subdivisions 5 and 6) for the Moderate-rated subbasins, and three subdivisions (subdivisions 7–9) for the Low-rated subbasins (see column 3 in Tables 7 and 8).
3. An equal percent of the initial allocation was assigned to each subbasin within a subdivision. Proceeding down from subdivision 1 to subdivision 9 (see column 4 in Tables 7 and 8), lower percents were assigned to subbasins. For Alternative S2, percents were summed for each subdivision, resulting in the total percent allocation for each subdivision. The same was done for Alternative S3. Percent allocated for Alternative S2 equaled 99.5; percent allocated for Alternative S3 equaled 101.25. The assignment of percentages was subjective, with only two criteria used: (1) the sum percent needed to be near 100; and (2) percents needed to grade downward from subdivision 1 to subdivision 9.
4. The second level of subdivision – a weighting by BLM- and Forest Service-administered ownership, applied to the first level of subdivision – began in Step 4 by listing the number of acres of BLM- and Forest Service-administered land per subbasin (see column 5 in Tables 7 and 8). BLM- and Forest Service-administered acres were summed per subdivision.
5. Within a subdivision, each subbasin's BLM- and Forest Service-administered acreage was divided by the sum BLM- and Forest Service-administered acreage for the subdivision; the resulting quotients were converted to percents, and these are presented in column 6 in Tables 1 and 2.
6. Within a subdivision, the subbasin percent in column 6 was multiplied by the total subdivision percent funding allocation (column 4, used in decimal form). The resultant outputs are in column 7 and represent the percent funding allocation for each high restoration priority subbasin.



**Table 7. Characteristics of Each High Restoration Priority Subbasin in Alternative S2 Used to Determine Funding Allocation.**

Subbasin Number	Landscape Restoration Priority	Subdivision	Initial Allocation (percent)	BLM-FS* Acres	Percent of Total BLM-FS* For Subdivision	Percent of Total Budget
17070202	H	1	5	719226	26.49	6.62
17070201	H	1	5	677443	24.96	6.24
17010301	H	1	5	540624	19.92	4.98
17060104	H	1	5	483028	17.79	4.45
17070203	H	1	5	294272	10.84	2.71
<i>Total for Subdivision 1</i>			25	2714593		25.00
17010101	H	2	4	1185696	59.53	9.52
17070304	H	2	4	413351	20.75	3.32
17020004	H	2	4	208516	10.47	1.67
17050121	H	2	4	184314	9.25	1.48
<i>Total for Subdivision 2</i>			16	1991877		16.00
17010213	H	3	3	1003608	39.57	9.50
17010216	H	3	3	392090	15.46	3.71
17070105	H	3	3	373547	14.73	3.53
17040214	H	3	3	296971	11.71	2.81
18020001	H	3	3	186782	7.36	1.77
17060306	H	3	3	156642	6.18	1.48
17060107	H	3	3	77576	3.06	0.73
17070307	H	3	3	49165	1.94	0.47
<i>Total for Subdivision 3</i>			24	2536381		24.00
17010211	H	4	2.5	284610	100.00	2.50
<i>Total for Subdivision 4</i>			2.5			2.50
17050116	M	5	2	1037175	44.10	2.65
17050103	M	5	2	989774	42.09	2.53
17010215	M	5	2	324659	13.81	0.83
<i>Total for Subdivision 5</i>			6	2351608		6.00
17040212	M	6	1.75	742965	27.53	2.89
17120006	M	6	1.75	484275	17.94	1.88
17040221	M	6	1.75	421753	15.63	1.64
17040105	M	6	1.75	396756	14.70	1.54
17040215	M	6	1.75	349342	12.94	1.36
17070204	M	6	1.75	303621	11.25	1.18
<i>Total for Subdivision 6</i>			10.5	2698712		10.50
17060303	L	7	1.5	716763	74.63	2.24
17070306	L	7	1.5	243597	25.37	0.76
<i>Total for Subdivision 7</i>			3	960360		3.00
17060201	L	8	1.25	1466509	35.86	2.69
17060208	L	8	1.25	829129	20.27	1.52
17060307	L	8	1.25	755829	18.48	1.39
17060202	L	8	1.25	471624	11.53	0.86
17040104	L	8	1.25	465691	11.39	0.85
17070102	L	8	1.25	100800	2.46	0.18
<i>Total for Subdivision 8</i>			7.5	4089582		7.50
17050113	L	9	1	676670	29.55	1.48
17060302	L	9	1	656718	28.67	1.43
17030001	L	9	1	365649	15.97	0.80
17060209	L	9	1	350822	15.32	0.77
17060210	L	9	1	240383	10.50	0.52
<i>Total for Subdivision 9</i>			5	2290242		

BLM-FS = BLM- and Forest Service-administered lands in the project area

**Table 8. Characteristics of Each High Restoration Priority Subbasin in Alternative S3 Used to Determine Funding Allocation.**

Subbasin Number	Landscape Restoration Priority	Subdivision	Initial Allocation (percent)	BLM-FS* Acres	Percent of Total BLM-FS* For Subdivision	Percent of Total Budget
17070202	H	1	4.5	719226	26.49	5.96
17070201	H	1	4.5	677443	24.96	5.62
17010301	H	1	4.5	540624	19.92	4.48
17060104	H	1	4.5	483028	17.79	4.00
17070203	H	1	4.5	294272	10.84	2.44
<i>Total for Subdivision 1</i>			22.5	2714593		22.50
17010101	H	2	3.5	1185696	59.53	8.33
17070304	H	2	3.5	413351	20.75	2.91
17020004	H	2	3.5	208516	10.47	1.47
17050121	H	2	3.5	184314	9.25	1.30
<i>Total for Subdivision 2</i>			14	1991877		14.00
17010213	H	3	2.5	1003608	33.08	8.27
17010216	H	3	2.5	392090	12.92	3.23
17010103	H	3	2.5	384944	12.69	3.17
17070105	H	3	2.5	373547	12.31	3.08
17040214	H	3	2.5	296971	9.79	2.45
18020001	H	3	2.5	186782	6.16	1.54
17060306	H	3	2.5	156642	5.16	1.29
17010105	H	3	2.5	112659	3.71	0.93
17060107	H	3	2.5	77576	2.56	0.64
17070307	H	3	2.5	49165	1.62	0.41
<i>Total for Subdivision 3</i>			25	3033984		25.00
17010211	H	4	2	284610	100.00	2.00
<i>Total for Subdivision 4</i>			2			2.00
17050116	M	5	1.75	1037175	44.10	2.32
17050103	M	5	1.75	989774	42.09	2.21
17010215	M	5	1.75	324659	13.81	0.72
<i>Total for Subdivision 5</i>			5.25	2351608		5.25
17040218	M	6	1.5	876810	19.77	2.97
17040212	M	6	1.5	742965	16.75	2.51
17120006	M	6	1.5	484275	10.92	1.64
17050117	M	6	1.5	434855	9.80	1.47
17040221	M	6	1.5	421753	9.51	1.43
17040105	M	6	1.5	396756	8.94	1.34
17040215	M	6	1.5	349342	7.88	1.18
17070204	M	6	1.5	303621	6.85	1.03
17050112	M	6	1.5	248791	5.61	0.84
17040201	M	6	1.5	176422	3.98	0.60
<i>Total for Subdivision 6</i>			15	4435590		15.00
17060303	L	7	1.25	716763	55.84	2.09
17010104	L	7	1.25	323152	25.18	0.94
17070306	L	7	1.25	243597	18.98	0.71
<i>Total for Subdivision 7</i>			3.75	1283512		3.75



**Table 8. Characteristics of Each High Restoration Priority Subbasin in Alternative S3 Used to Determine Funding Allocation. (continued)**

Subbasin Number	Landscape Restoration Priority	Subdivision	Initial Allocation (percent)	BLM-FS* Acres	Percent of Total BLM-FS* For Subdivision	Percent of Total Budget
17060201	L	8	1	1466509	28.50	2.85
17060208	L	8	1	829129	16.11	1.61
17060307	L	8	1	755829	14.69	1.47
18010202	L	8	1	568759	11.05	1.11
17060202	L	8	1	471624	9.16	0.92
17040104	L	8	1	465691	9.05	0.91
17010206	L	8	1	292767	5.69	0.57
17040207	L	8	1	158598	3.08	0.31
17070102	L	8	1	100800	1.96	0.20
17010305	L	8	1	36320	0.71	0.07
<i>Total for Subdivision 8</i>			10	5146026		10.00
17050113	L	9	0.75	676670	29.55	1.11
17060302	L	9	0.75	656718	28.67	1.08
17030001	L	9	0.75	365649	15.97	0.60
17060209	L	9	0.75	350822	15.32	0.57
17060210	L	9	0.75	240383	10.50	0.39
<i>Total for Subdivision 9</i>			3.75	2290242		3.75

\* BLM-FS = BLM- and Forest Service-administered lands in the project area.

# Appendix 15

## Development of Restoration Priorities

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### Summary

Appendix 15 describes the developmental steps of the restoration strategy within Alternatives S2 and S3. It discusses restoration components and willingness to accept risk from restoration actions. It contains an explanation of the rulesets used to develop functional (for example, aquatics or economics) restoration priorities (see Maps 3-2 to 3-7) and the high restoration priority subbasins (see Maps 3-8 and 3-9).

Appendix 15 (approximately 32 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.

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# Appendix 16

## Science Advisory Group Assumptions for Modeling the Supplemental Draft EIS Alternatives

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# Introduction

## Background

As in any analysis predicting the effects of management direction, judgements must be made about the logic that links objectives and direction with actions implemented, monitoring undertaken, and effects projected. The judgements are simpler in small analyses of single, specific projects; judgements grow more complicated when the analysis encompasses millions of diverse acres and when subsequent analyses and decisions will be made before projects are implemented and effects realized. Assumptions about implementation of direction contained in this Supplemental Draft EIS were developed to reflect consequences of subsequent decisions and effects. As in the analysis of the Draft EIS alternatives, assumptions constitute a given and important facet of the environmental analysis of effects.

The projection of effects by the Science Advisory Group (SAG) was based, in part, on a variety of assumptions about future management conditions that were coordinated with the EIS Team. This subset of assumptions is included in the first part of this appendix (Appendix 16).

In addition, the SAG made assumptions regarding relationships among ecosystem components where definitive empirical studies do not exist, and concerning probable outcomes from implementing management activities or from succession/disturbance processes. These additional assumptions are presented in the last part of this appendix. The models that were used by SAG also have inherent assumptions. Some of those assumptions are included in this appendix, and the rest are documented in the *Science Advisory Group Effects Analysis for the SDEIS Alternatives* (Quigley 1999).

Included in this appendix are those assumptions that clarified interpretation of direction, intent, and/or rationale; provided enough detail to derive outcomes for viability determinations for species of broad-scale concern; and described reasonable implementation for elements not fully described in the supplemental Draft EIS, such as implementation strategy, step-down processes, monitoring strategy, data management, and technology transfer.

The EIS Team provided storylines, budget estimates, and allocation priorities that were not part of the Supplemental Draft EIS direction but were key to the

modeling exercise. The assumptions draw directly from the intent; process descriptions; specific standards, objectives, goals, guidelines; and storylines associated with each Supplemental Draft EIS alternative. The intent of assumptions is not to artificially restrict management to achieve the most favorable of outcomes; rather, it is to establish the clarity necessary for analysis purposes in the evaluation of the alternatives.

Because of the full suite of assumptions necessary to project effects (including those presented here and those documented in the *SAG Effects Analysis*), a level of uncertainty is associated with the projected effects. As in any analysis, there is risk associated with the projections of effects if the assumptions are in error and/or if the assumptions do not hold into implementation. Adaptive management and monitoring (particularly validation and effectiveness monitoring) are designed to ensure that managers are able to adjust if effects were not accurately portrayed for a variety of reasons, including errors in assumptions.

## Methods for Evaluation of the Supplemental Draft EIS Alternatives

The Science Advisory Group (SAG) used a series of models to simulate the management direction as it would reasonably be implemented during the next decade and the next century. Many models had been developed as a part of the *Assessment of Ecosystem Components in the Interior Columbia Basin and portions of the Klamath and Great basins* (Quigley and Arbelbide 1997) or the *SIT Evaluation of EIS Alternatives* (Quigley, Lee, and Arbelbide 1997). Some new models were developed specifically for the *Science Advisory Group Effects Analysis of the SDEIS Alternatives* (Quigley 1999). The SAG conducted this complex evaluation within tight timelines. In some instances time became the limiting factor in the derivation of effects.

The primary model simulations were for vegetation, disturbances, management activities, and key variables related to landscape conditions. These outcomes and variables were then used as input into other analyses directed toward aquatic, terrestrial, and socio-economic outcomes. The implementation strategy, monitoring strategy, and step-down details have not yet been completed and will not be fully completed until after the signing of the Record of Decision. Some clarity was needed, therefore, to understand how implementation would reasonably occur. The SAG developed a set of assumptions



working with the EIS team. Where empirical relationships did not exist linking inputs to outcomes, assumptions about those relationships were developed.

The effects analysis focused primarily on impacts associated with the Forest Service- and BLM-administered lands of the interior Columbia Basin. Effects were presented at the basin level (to gain some insights into potential cumulative effects), the ICBEMP project area (all Forest Service- and BLM-administered lands to which the Supplemental Draft EIS would apply), the RAC/PAC area, and areas designated for specific purposes (for example, evolutionarily significant units for anadromous fish). The simulations assumed continuation of existing management direction and activity levels across non-Forest Service and BLM-administered lands in the basin. Thus, changes reflect only the effects from implementing the direction contained in the Supplemental Draft EIS.

## Supplemental Draft EIS Alternatives Effects Analysis Assumptions

This section contains the specific assumptions coordinated with the EIS team. The document includes the following sections:

- ◆ Brief Description of the Process Used to Develop Assumptions
- ◆ General Assumptions
- ◆ No-action Alternative (Alternative S1) Landscape Modeling Assumptions
- ◆ Action Alternatives (Alternatives S2 and S3) Modeling Assumptions
- ◆ Landscape Assumptions
- ◆ Assumptions About Landscape Integrity and Management Approaches
- ◆ Terrestrial Assumptions
- ◆ Assumptions for Modeling Effects on Aquatic Species and Habitat
- ◆ General Restoration Assumptions for Evaluation of Supplemental Draft EIS Alternatives.

## Brief Description of the Process Used to Develop Assumptions

These brief descriptions are not intended to provide sufficient detail to be self-explanatory, and they are not intended to be a complete listing of all the assumptions made in the *SAG Effects Analysis of SDEIS Alternatives* (Quigley 1999). These descriptions are brought together here to assist in the further discussions related to alternatives, to assist in clarification on assumptions, and as general background on the interpretation of assumptions. Some assumptions taken out of context of the full discussion could be misinterpreted. It should be recognized that every model is built on a set of relationships with imperfect knowledge and uncertainty. Each SAG staff area has used models in one form or another. The documentation for each SAG staff area's modeling is not completely repeated here. Rather, this document assembles the major assumptions regarding interpretation of direction in the Supplemental Draft EIS and how it plays into the evaluation. Relationships among parameters in models drawn from experts or the literature are not repeated here.

The assumptions draw directly from the EIS the intent; process descriptions; specific standards, objectives, goals, and guidelines; and storylines associated with each alternative. The intent of the assumptions is NOT to artificially restrict management to achieve the most favorable of outcomes; rather, the intent is to establish the clarity necessary for analysis purposes in the *SAG Effects Analysis of SDEIS Alternatives*.

## General Assumptions

Regulatory agencies will be staffed with adequate expertise and resources to participate in a timely and effective manner as interagency partners in implementation and monitoring.

The manner in which available funds are allocated across the project area and among possible treatments affects the degree to which the achieved outcomes reflect the outcomes projected in Chapter 4 of the Supplemental Draft EIS. Implementation of the action alternatives presumes funds are focused on the restoration work that has been identified as priority, through management direction (such as specific objectives) or designation (such as in an A2 subwatershed). It is assumed that changes from



current practices for handling funding allocations will occur, with priorities for funding requests and allocations collaboratively set at the regional and subregional scales. Any projected improvements in ecological conditions associated with Alternatives S2 and S3 presume a change to a more broad-scale approach that considers priorities among and between administrative units.

The outcomes projected for each alternative presume funding levels and distribution as per those used for modeling the alternatives. The increased budget emphasis on the high restoration priority subbasins in Alternatives S2 and S3 is evident when all the priorities, objectives, standards, and assumptions are taken together. Translating all these elements into budgets for modeling purposes resulted in funding increases of 37–40 percent per acre for the high restoration priority subbasin areas in Alternatives S2 and S3, compared to the average cost per acre in these same areas in Alternative S1.

BLM and Forest Service administrative units will have appropriate expertise and experience available to them in-house, through service centers, or through contracting to implement and monitor the ICBEMP direction effectively. Line officers will ensure necessary training, including technology transfer, is provided in a timely manner and as needed, through mechanisms such as those already in place (certification programs, RIST teams) or through new mechanisms designed to fill training gaps.

Practices used to implement Alternatives S2 and S3 of the Supplemental Draft EIS are to be based on ecological goals and objectives. Current practices (Alternative S1) have moved toward more ecological practices but still are more focused on traditional practices.

Subbasin review/analysis and/or ecosystem analysis will be the primary vehicle for setting landscape and project goals and objectives, although in some cases similar results can be achieved through programmatic processes such as range allotment planning or large scale prescribed fire plans. Subbasin review/analysis and ecosystem analysis combined with NEPA processes will be used to determine acceptable practices to achieve the objectives.

An implementation strategy will provide more definitive guidance to the field regarding the alternative that is selected.

A monitoring strategy will be developed to accompany the implementation strategy. It will include a hierarchical approach.

The prescription (Rx) emphasis as brought forward in the Landscape Ecology modeling for the alternatives represents a reasonable simulation of the alternatives. This modeling was based on the Chapter 3 direction package and the EIS Team storylines (found in Appendix 14). The resulting landscape variables should be used as an indicator of trends among alternatives and should not be reported at a level lower than the subbasin or groups of subbasins.

It is estimated that very little change in road density classes will result for any of the alternatives for the first decade. This assumption is due to the large amount of road closures or new roads it would take to move a road density class from the current class. Trends of change (stable, up, down) estimated for the first decade and the long term (100-year estimates) show both a trend and a predicted road density class. An increasing trend can be interpreted as road increases that would be expected to affect ecological outcomes.

Road density classes were modeled as a dominant class by subwatershed. It was estimated by ownership (BLM- and Forest Service-administered, other) within each subwatershed using the 1 km pixel predicted road density data. Non-federal lands are assumed to remain in static (unchanged) trend and density class in the short and long terms.

## **No-action Alternative (Alternative S1) Landscape Modeling Assumptions**

The project compiled activity-level data (prescribed fire, wildfire, timber harvest, timber volume and authorized AUMs) for each administrative unit in the basin for 1988 through 1997. These data were used to assign a base landscape modeling prescription (Rx) to calibrate the models to the current level of activity by administrative unit. These data are assumed to adequately reflect current management levels based on individual administrative land use plans, gray wolf recovery plan, and the Eastside Screens.

The 1988–1997 activity level data are not assumed to fully reflect changes in activity levels by administrative units that are attributed to adoption of : PACFISH/INFISH requirements; Biological Opinions for bulltrout, steelhead and chinook salmon; the recovery plan concerns for caribou and grizzly bear; and the Healthy Rangelands initiative for the BLM.



Therefore, additional consideration was taken to address these initiatives in the SAG landscape modeling:

- ♦ The Landscape simulation prescription (Rx) assignments reflect lower activity levels for timber, range, and prescribed fire to account for the limitations of the 1988–1997 data to address: (1) EAWS and RCAs as required within priority watersheds (steelhead, bulltrout, chinook salmon); (2) RCAs (PACFISH/INFISH area) outside the priority watersheds ; and (3) caribou and grizzly bear recovery plan area requirements (road reductions and human activities that affect habitat or animals) outside priority watersheds.
- ♦ Healthy Rangelands for the BLM are assumed to have a long-term decrease on authorized AUM levels, and the CRBSUM prescription (Rx) assignments were modified accordingly.

## Road Management and Road Density

### Road Policy

It was assumed that the current national process for road policy being conducted by the Forest Service will be brought to a conclusion in the next several years. The outcome will be analysis requirements and the need for additional justification for constructing new roads. The SAG assumed it will slow the rate of growth of new roads on Forest Service-administered lands in both the short and long terms. The SAG also assumed the existing minimal level of road construction on BLM-administered lands will continue.

### Road Increases

Areas assigned the following prescriptions (Rx) would show an increasing trend in road density classes for the short term, and in the long term they would increase one road density class (for those currently classified as extremely low, and low) outside priority watersheds: Forested PVGs: N3, N8, C2, C3, P3 (see Table 1 for brief description).

### Unroaded Areas

Areas currently unroaded (predicted road density of none) would remain unroaded (trend and density class) for the short term and the long term on BLM- and Forest Service-administered lands. It is recognized that road entry is not prohibited, but it will be rare to deal with hazards, risks, and property. Some existing land use plans allow for entry into unroaded areas but this is expected to be limited.

## Priority Watersheds

Areas within the bulltrout, steelhead, and chinook priority watersheds with high and extremely high road densities will be reduced in the short term and the long term (declining trend), and no increases in road density classes in priority watersheds will occur on BLM- and Forest Service-administered lands.

### Recovery Plans

Forested areas within grizzly bear recovery areas with high and extremely high road densities will be reduced in the short term (declining trend) and will be reduced by one road density class in the long term on BLM- and Forest Service-administered lands.

Forested areas within the caribou recovery area with high and extremely high road densities will be reduced in the short term (declining trend) and the long term but not enough to reduce road density classes on BLM- and Forest Service-administered lands.

## Action Alternatives (Alternatives S2 and S3) Modeling Assumptions

In Alternatives S2 and S3, Healthy Rangelands standards and objectives are to be applied to both BLM and Forest Service lands. It is assumed that these requirements will decrease authorized AUMs through time, improve exotic weed control, and speed up restoration of rangelands approximately 20 percent faster in the long term than current management (or the recent trend in activity levels). The SAG attempted to model this. However, accelerated restoration on areas dominated by cheatgrass and wildfire disturbance regimes will require more restoration emphasis, and the changes may be slower.

- ♦ For modeling purposes, Base Level direction prescription (Rx) assignments in rangelands dominated by wildfire disturbance regimes (base Rx assignment of P2) were modeled with a restoration emphasis prescription only where there were base funding levels to treat an entire subwatershed with a restoration emphasis prescription (A1, A2 or A3).
- ♦ Chapter 3 direction indicates that Ecosystem Analysis at the Watershed Scale (EAWS) will occur in areas where it is triggered (approx-



mately 62 percent of the Forest Service- and BLM-administered lands). For modeling purposes, EAWS is assumed to be completed within 5 years in 50 percent of the triggered areas and in the remainder of this area within 13 years for Alternative S2. It is also assumed for Alternative S2 that other EAWS priorities as identified through Subbasin Review will occur on 50 percent of the area outside areas that are triggered (an additional 19 percent of Forest Service- and BLM-administered lands) within a 13-year period. Thus, within 13 years EAWS will occur on approximately 81 percent of the Forest Service- and BLM-administered areas for Alternative S2. For Alternative S3 there are no triggered areas. It is assumed that EAWS priorities will be generated within 10 years through the Subbasin Review process on approximately one-third (33 percent) of the areas where Subbasin Review is to occur.

## **Road Management and Road Density**

Assumptions for modeling road densities for the action alternatives are the same as the no-action alternative (Alternative S1) except for the following:

### **Roads**

It is assumed that analysis requirements and additional justification for constructing new roads will exist for both the Forest Service and the BLM. It is assumed that this will slow the rate of growth of new roads on Forest Service-administered lands in the short and long terms, and it will maintain the minimal road construction on BLM lands in the short and long terms.

Areas assigned the following landscape modeling prescriptions (Rx) would show an increasing trend in road density classes for the short term and the long term, with no changes in net road density class (for those currently classified as extremely low, and low): Forested PVGs: N3, N8, C2, C3, P3, A2, A3.

### **A1 and T Areas**

No increases in trend or net increases in road density for the short and long terms in A1 and T areas.

### **A2 areas (outside)**

No net increases in road density for the short term.

In the short term, there will be a decreasing trend in areas with greater than or equal to moderate road density and no net increase in road density.

In A2 subwatersheds in the long term, there will be a decreasing trend for extremely low, low, moderate, high, and extremely high road density areas. In A2 subwatersheds at the lower end of high and extremely high, road density classes would reduce one density class. *For modeling purposes it was assumed all pixels in high and extremely high in A2 areas (outside A1 and T) would reduce a class in the long term.*

## **Aquatic Restoration Priority Subbasins (outside A1, T, and A2)**

For the long term, there will be a decreasing trend in moderate, high, and extremely high, and a decrease in class for extremely high.

### **Other Areas (outside those mentioned here)**

There will a decreasing trend and no net change in density classes in high and extremely high road densities in the short and long terms.

## **Landscape Assumptions**

Because no complete implementation plan existed within the Supplemental Draft EIS, it was essential that assumptions be made regarding reasonable implementation processes in order to estimate effects on landscape parameters. A mix of landscape modeling prescriptions across the basin simulates the implementation of each alternative. For the landscape analysis, the SAG developed a set of assumptions concerning the types of management that would most likely result in positive trends in landscape integrity. These assumptions enabled the SAG to understand how outcomes might be related to the conservation of productivity and native habitats. It was assumed that the more the alternatives use implementation processes similar to these or others that SAG thought would result in similar outcomes, the more likely the alternative would result in positive trends for landscape integrity on the Forest Service- and BLM-administered lands.

There is no specific direction for prioritization of management-ignited fires in wilderness areas (MAC 1) for any of the alternatives. The direction that is in Alternatives S2 and S3 in Chapter 3, as well as the storylines (Appendix 14), either indicates only wild-land fire use for resource benefit (natural ignitions) or does not distinguish between ignition types under the prescribed fire storylines. Consequently, it is assumed that the level of management-ignited fires in wilderness areas will be small relative to the area



available within wilderness areas. However, when management-ignited prescribed fire does occur, it is assumed that individual hydrologic units will be managed as a whole.

There is strong direction (standards and storylines) in both Alternatives S2 and S3 for low amounts of integrated landscape-scale (hydrologic unit) restoration in the A1 subwatersheds and T watersheds, and moderate to high amounts in the A2 subwatersheds (levels depend on integrated restoration assignment). For Alternatives S2 and S3, the SAG assumed that Subbasin Review will occur and result in a context for this type of restoration in the A1, T, and A2 hydrologic units within the subbasin for treatment. For Alternative S2, it is assumed that landscape-scale (appropriate hydrologic unit) integrated risk/opportunity step-down assessment and restoration pattern design would occur via EAWS, or as part of site-specific analysis in order to step-down integrated risks and opportunities. This supports the assignment of landscape-scale restoration prescriptions (N1, N4, A1, A2, A3). With the lower level of EAWS in Alternative S3, it is assumed that this type of restoration may be less effective. Instead, the SAG assumed that smaller scale patches (N6, N5) of restoration would occur in forests, and that management on rangelands would implement Healthy Rangelands on both BLM- and Forest Service-administered lands.

There is direction (objectives and storylines) in both Alternatives S2 and S3 for integrated landscape-scale (hydrologic unit) restoration in the urban-rural-wildland interface areas using aggressive prescribed fire and mechanical activities. The SAG assumed this direction cannot be met without a landscape-scale (appropriate hydrologic unit) integrated risk/opportunity step-down assessment and restoration pattern design. Consequently, for both Alternatives S2 and S3 it is assumed that Subbasin Review will occur and result in a prioritization of hydrologic units within the subbasin for treatment. The SAG assumed that the hydrologic units picked for treatment would have a landscape step-down assessment completed as part of EAWS or project analysis in order to step-down integrated risks and opportunities. This supports the mapping of aggressive restoration prescriptions (A1, A2, A3) for modeling purposes in the high and very high risk areas within the urban-rural-wildland interface. With the lower level of EAWS in Alternative S3, it is assumed that this type of restoration may be less effective.

## Storylines

It is assumed that the written rationale of Objective R-O4, with associated storyline table and written

interpretation, will be used to guide implementation of management on Forest Service- and BLM-administered lands in the ICBEMP project area. Without this assumption, it is not clear how the rationale and storylines would play into prioritizing activities as appears to be the intent of the storylines. The storylines include a hierarchy for modeling and an inference to activity levels by priority areas. This information provides more specificity than could actually be simulated in the broad-scale landscape ecology models. The activity information and suggested landscape modeling prescriptions (Rx) were used in a general sense to guide how prescriptions were allocated to the landscape. To the extent that storylines or management direction are at finer detail than can be modeled (for example, if storylines describe more specificity than was modeled with broad-scale data), the SAG qualitatively (and quantitatively to the extent possible) considered the finer details in determining and documenting effects.

## Budget

It is assumed that the modeling of the Base Level direction will be limited to the current BLM and Forest Service costs provided by the EIS Team, and that additional restoration funds for Alternatives S2 and S3 would be prioritized within the high restoration priority subbasins as described in the storylines (Appendix 14) using the percentage of restoration targets by subbasin provided by the EIS Team. Landscape level restoration prescriptions (Rx) were used in the assignment of Base Level prescriptions for wildland fire risk areas, A2 subwatersheds, and high restoration priority areas (from storylines and Objective R-O4) where base funding allowed.

## Implementation Organization Structure

It is assumed that there will be an organizational structure in place for implementation of the Record of Decision (ROD). The actual structure is yet to be defined, but it will be based on the preliminary decisions of the ICBEMP Executive Steering Committee (ESC). It is expected to include structures appropriate to address basin oversight, monitoring, data management, subregional analysis, coordination, dispute resolution, science advice, and technology transfer. Details on location, membership, and duties of implementation teams are assumed to be developed prior to beginning actual implementation. The subregional organization is expected to align with modified RAC/PAC areas.



## **Landscape Integrity and Management Approaches**

The landscape integrity and management approaches are mostly the same as for the original Landscape Ecology *Evaluation of Alternatives* (see Hann, Karl, Jones, et al. 1997). Two important measures of landscape integrity at all scales are: (1) productivity and associated processes, and (2) diversity of habitats and associated processes. Generally, in wildland environments, native communities are more productive and more resilient to disturbances such as fire, drought, and insects/disease, than are communities that have been modified by traditional agricultural, forest, or range management, or by conversion to exotic communities. As native habitats are modified or converted to exotics, there is typically a decline in the native fauna and flora that depend on these habitats. Management that conserves native habitats is more likely to avoid further declines in native species.

The following assumptions describe what the SAG views as implementation and management approaches that are most likely to result in high landscape integrity from the broad perspective. They are intended to outline the concepts of landscape integrity that cross the biophysical, social, and economic boundaries at the broad scale and will be used to summarize and compare alternatives. These are assumptions that the SAG feel will vary in the degree of implementability between alternatives.

### **Landscape Approach to Management**

It is assumed that through time the management of BLM- and Forest Service-administered lands will shift increasingly toward a landscape approach under all alternatives. Under this assumption, BLM- and Forest Service-administered lands are managed as a whole within watersheds and as connected lands between watersheds. Forests and rangelands intermingled within or between watersheds are managed on an integrated basis for both resources and habitats. Hydrologic and riparian regimes within watersheds are managed as integral networks of forests and rangelands. Managers will increasingly recognize that ownership pattern strongly affects implementation of a landscape approach. Watersheds dominated by continuous BLM and Forest Service ownership would be more likely to achieve long-term desired patterns, while watersheds with mosaic or mixed ownership would be less likely.

## **Successful Ability to Resemble/Represent Processes**

It is assumed that managers will develop the ability to assess and implement landscape management to more closely resemble native landscape, community conditions, and processes over space and time for all alternatives. The level at which this will be implemented varies among alternatives. This does not infer that these conditions are always representative of the historical range of variability (HRV), which is the variability of regional or landscape composition, structure, and disturbances during a period of time for several cycles of the common disturbance intervals and for similar environmental gradients. Understanding and managing within the limitations and options of the biophysical environment would conserve processes associated with native composition and structure.

## **Hierarchical Assessment, Implementation, Monitoring, and Evaluation**

It is assumed that Forest Service and BLM inventory programs and methods will be based on landscape processes and gradients to integrate ecological conditions and resource values. It is assumed in Alternatives S2 and S3 that there will be a hierarchical assessment for implementation, monitoring and evaluation through the step-down process (Subbasin Review, EAWS, and land use planning). The level of assessment in this manner will be less in Alternative S3 than in Alternative S2, because EAWS is not triggered in certain areas and is determined necessary only through the Subbasin Review process.

## **Prioritization and Integration of Activities**

It is assumed that through time, activities that produce commodities and restore landscape conditions will be implemented in a prioritized manner with emphasis on achieving an integrated landscape and maintaining ecological integrity and socio-economic resiliency. The level at which this will be implemented varies among the alternatives. In Alternative S1, subbasin assessments and EAWS will assist in providing a process for prioritization of aquatic restoration activities and management in limited areas and functions. It is assumed in Alternatives S2 and S3, that there will be an assessment of status, risk, and opportunities as well as prioritization of activities and



restoration through the step-down process (Subbasin Review and EAWS). The level of prioritization in this manner will be less in Alternative S3 than in Alternative S2, since EAWS is not triggered in certain areas and is determined necessary only through the Subbasin Review process.

It is assumed that these priorities are set regionally using information at the 4th-field Hydrologic Unit Code (HUC) level. These priorities are placed in context with priorities at higher levels (such as international air quality agreements or biodiversity agreements or national agreements among states). Priorities are set on smaller watershed areas within the 4th-field HUC by considering integrated information when conducting ecosystem analysis at the landscape or watershed scale.

### **Concentration of Activities Temporally and Spatially**

It is assumed that through time, the implementation of activities such as access for timber harvest, use of prescribed fire, and road access management will be concentrated in time and space to better reflect the biophysical environment. The level at which this will be implemented varies among the alternatives. In Alternative S1, subbasin assessments and EAWS will assist in providing a hierarchical assessment for planning activities with an aquatic focus. It is assumed for Alternatives S2 and S3 that there will be a hierarchical assessment for status, risk, and opportunities as well as prioritization of activities and restoration through the step-down process (Subbasin Review and EAWS). The level of assessment in this manner will be less in Alternative S3 than in Alternative S2, since EAWS is not triggered in certain areas and is determined necessary only through the Subbasin Review process.

### **Road Management**

It is assumed for all alternatives that new road construction will be prioritized for low sensitivity land types and 6th-field code HUC watersheds within the context of objectives specifying reductions in adverse road-related effects. Road management prioritizes reductions in road density in moderate-to-high sensitivity watersheds and land types. Drainage systems and culverts will be reconstructed, as needed, and maintained to minimize delivery of sediment into streams. Bridges and culverts are reconstructed, as needed, in locations that reduce impacts on the river and stream channel systems.

### **Fire Management**

It is assumed the fire suppression and fuels programs will be managed to attain landscape conditions within the capabilities of the biophysical environment for all alternatives at varying levels. Less emphasis on this will occur within Alternative S1. It is assumed for Alternatives S2 and S3 that there will be a hierarchical assessment for status, risk, and opportunities as well as prioritization of activities and restoration through the step-down process (Subbasin Review and EAWS). The level of assessment in this manner for management of fire will be less in Alternative S3 than in Alternative S2, since EAWS is not triggered in certain areas and is determined necessary only through the Subbasin Review process.

### **Forest and Range Integrated Landscape Management**

It is assumed that management activities will be designed and implemented to integrate planning, implementation, and monitoring for ecological integrity, while considering social and economic resiliency for Alternatives S2 and S3. To a much lesser degree, Alternative S1 is assumed to address integrated landscape management because subbasin assessment and EAWS are only conducted where required by the aquatic component of the ecosystem. Management emphasis will shift toward managing landscape processes to provide the most effective “fit” with the biophysical environment and associated pattern of succession/disturbance regimes.

### **Management of Different Potential Vegetation Groups (PVGs)**

It is assumed that management of potential vegetation groups is done in a landscape context in all alternatives. The level at which this will be implemented varies among the alternatives except Alternative S1. There will be emphasis to avoid both the introduction and spread of exotic and noxious weeds. Any seeding that is deemed absolutely necessary would use native species whenever possible; any non-native species used should, when possible, be ones that do not produce viable seed. Non-native species are used for restoration only if there are no native species that can compete with undesirable exotics or that will stabilize the site.



## **Terrestrial Assumption**

Where domestic sheep allotments overlap bighorn sheep occurrence: in 10 years, 10 percent of the allotments will be closed to domestic sheep; in 100 years 100 percent of the allotments will be closed to domestic sheep.

## **Assumptions for Modeling Effects on Aquatic Species and Habitat**

Many assumptions are inherent in the development of the model structure and the estimates for the conditional probability tables (cpts) and are not captured in this list. Some will be evident in the documentation of the model. In some cases, particularly where the aquatic staff used expert judgment to develop cpts, those assumptions are essentially expert opinion and are captured in the model but are not described here or in the model documentation. Changes in any of these assumptions could change the cpts and the resulting outcomes for habitat and species status.

## **Assumptions Related to Interpretation of the Alternatives**

Although monitoring and adaptive management are important considerations in the evaluation of the alternatives, they were assumed to not differ substantially across the alternatives. That is, the SAG aquatic staff did not specifically model adverse or improved conditions based solely on the way monitoring or adaptive management would be applied in any one alternative.

It is assumed that the interpretation of the Supplemental Draft EIS and resulting predictions of landscape characteristics and disturbance provided by the SAG landscape team are generally accurate in value and spatial representation. It is also assumed that information generated in the *Assessment* (Quigley and Arbelbide 1997) and available in existing basin coverages is generally accurate in value and spatial location. It is known that errors exist in the data and in some cases the relative magnitude of the error is not quantified. The SAG is essentially assuming that those errors do not meaningfully compromise the results of the analysis.

The aquatic team assumes that the landscape modeling/interpretation of the Supplemental Draft EIS activity and disturbance levels does not fully account for the effects of mitigation or restoration from the aquatic management direction reflected in the objec-

tives, standards, and guidelines. The scale of the mitigation or restoration guided by the direction is too fine to be fully accounted for in the landscape modeling. This degree of detail is accounted for in the effects analysis through the aquatic models.

It is assumed that the influence of management direction and the function of riparian areas are essentially the same in forested and range areas. A functional (or non-functional) riparian area in rangeland is equivalent to a functional (or non-functional) riparian area in forested land as far as the fish are concerned.

The SAG assumed that decreases in road density reflect the actual removal of roads and most of their related adverse effects on the landscape. It is recognized that removal may not include re-contouring if inappropriate, but does include re-vegetating and no vehicular use and the restoration of hydrologic function. It is also recognized that some road removal projects will not fully eliminate all the related adverse effects.

It is not assumed that disturbance necessarily adversely affects aquatic habitat or that habitat conditions would always be high if there were no management-related history or activity. The nature of sediment, hydrologic, and riparian-related processes and the nature, extent, and distribution of states or conditions resulting from those processes can be altered from those expected in the absence of management activities. Thus, aquatic conditions can be adversely affected by natural events or management activities.

Effects of T watershed and old-forest management on aquatics would be expected to be more similar to A2 subwatersheds than Base Level. However, the area within a subwatershed that would be managed for T watershed or old-forest objectives is uncertain. The aquatic team assumed Base Level management objectives and standards for aquatics would apply to T and old-forest areas. Any differences in activities in those areas would be reflected in the landscape prescriptions affecting related landscape variables (for example, bare ground or grazing).

Areas outside of designated wilderness areas included in MACs 1 and 2 (for example, wilderness study areas), which were assigned the same conditional probabilities as designated wilderness areas, will not be used for activities that could reduce their capacity or function as aquatic habitat.

Priority watersheds (Alternative S1 only) include those designated for Snake River steelhead and chinook, upper Columbia steelhead, and a proxy



for bull trout using the complete current distribution. Priority watersheds for mid-Columbia steelhead and upper Columbia chinook have not yet been designated.

### Short-term vs. Long-term Landscape Restoration Risk

Short-term risks of restoration activities are greatest in subwatersheds needed to maintain strong and fringe populations and populations in areas with high genetic and aquatic community integrity and where depressed populations are important to recover threatened, endangered, and proposed (TEP) species or to maintain broader distribution of the taxa. Landscape restoration can have long-term beneficial effects on aquatic species. Although there will be higher levels of landscape restoration and resulting higher risks of short-term effects on aquatics in high restoration priority subbasins, management area designation (that is, A2 and TEP) and analysis and planning prior to restoration will reduce that risk compared with non-A2, non-TEP, or non-high-restoration-priority subbasins. There is also higher probability of restoration being effective when preceded by subbasin review/analysis and EAWS or equivalent.

For Alternatives S2 and S3, it is assumed that implementation of the water quality protocol would correspond with occurrence of EAWS and with the required roads analysis.

Field units will be staffed with adequate aquatic expertise to effectively implement analysis, conservation, and restoration direction.

Probabilities for high restoration priority subbasins reflect uncertainty about the level of increased aquatic restoration and the specific subwatersheds where it will occur. Probabilities for benefits to aquatic species and habitats in high restoration priority subbasins will be higher in subbasins identified as priorities for aquatic restoration.

There is greater uncertainty regarding the effectiveness of restoration in A2 subwatersheds and other aquatic restoration priority areas compared to conserving existing high quality aquatic habitat (for example, A1 subwatersheds). That is, maintaining high quality habitats is easier than restoring degraded habitats.

Except for EAWS triggers, management direction for TEP species outside of the A1/A2 network does not differ substantially from Base Level (that is, no

additional BO requirements for Alternatives S2 and S3 are assumed).

Mining could adversely affect aquatic habitat condition under all alternatives, but data were inadequate to determine its potential effects in a spatial context.

Subwatersheds managed under Base Level (Alternatives S2, S3), PACFISH/INFISH Key Biological Opinions, INFISH, and BLM scenarios will tend to have predominately moderate-low current habitat conditions since areas managed under the wilderness, roadless, and A1 scenarios will be more likely to have higher quality current habitat conditions. Habitats that are currently low quality will be more difficult to restore and take substantially longer to restore than habitats that are currently in moderate condition and still retain the components of functional watersheds. Forested subwatersheds can generally be restored more rapidly and extensively than more arid rangeland habitats.

Interim Forest Service direction for roadless areas will be replaced by comparable long-term direction for Forest Service-administered lands. That direction primarily restricts road building but does not change the management allocation. For example, timber harvest and other uses could still occur but would rely on access not dependent on new roads. Base level (Alternatives S2, S3) or existing standards (such as PACFISH/INFISH) would apply to activities other than road building that occur in roadless areas. It was assumed the existing minimal level of road construction on BLM lands will continue.

Increased conservation and restoration are anticipated in some areas outside of Forest Service- and BLM-administered where listed species occur (for example, the Oregon Plan).

Fifth-field HUCS occupied by listed Klamath Basin, Lost River, and short nose suckers; recently listed mid Columbia steelhead and upper Columbia chinook; and other listed species were modeled as PACFISH Key/INFISH Priority BO watersheds under Alternative S1.

### General Restoration Assumptions

The Supplemental Draft EIS includes goals to sustain and where necessary restore the health of forest, rangeland, aquatic, and riparian ecosystems. Alternatives S2 and S3 specifically define restoration strategies as one component of the overall risk management approach within the alternatives.



No explicit definition of restoration is provided in the Supplemental Draft EIS. The assumption made regarding the definition of restoration was to adopt the definition used by the Society for Ecological Restoration: "Ecological restoration is the process of assisting the recovery and management of ecological integrity. Ecological integrity includes a critical range of variability in biodiversity, ecological processes and structures, regional and historical context, and sustainable cultural practices." (Society for Ecological Restoration web site <http://ser.org/definitions.html>)

The SAG assumed restoration strategies in the Supplemental Draft EIS are generally aimed at combining actions with protection of resources in such a way as to maintain or restore ecological integrity in forest, rangeland, aquatic, and riparian ecosystems. Thus, restoration includes passive as well as active approaches to achieving desired conditions in ecosystems in the project area. Examples of restoration treatments can include:

Thinning vegetation to reduce fuel loadings, thereby reducing stress on the system and creating an environment within which ecological processes are more likely to operate in ways characteristic to the area;

Obliterating roads, thereby restoring many of the ecological processes to the area;

Prohibiting some management actions in some critical areas, thereby limiting the possibility that ecological processes will be interrupted; or

Modifying grazing in riparian areas, thereby increasing the possibility that riparian vegetation will increase and provide more protection to aquatic resources as well as enhanced habitats for terrestrial species.

The degree to which restoration objectives will be met depends on planned as well as unplanned events.

### **Effectiveness of Ecological Restoration**

It is assumed that restoration of ecosystems can involve passive as well as active approaches. Given the interrelationships among ecosystem components, the strong interconnections that exist among components, the dynamic nature of the ecosystems, and the high degree of variability that exists within the interior Columbia Basin, it is not expected that all systems will respond similarly to either active or passive restoration approaches. The SAG relied on

models that reflect changing conditions based on activities, succession, and disturbances. The SAG recognizes that restoration treatments will not be 100 percent effective, no matter how well planned, how well installed, or how strong the intent to design and implement a successful project. When preceded by context-setting analysis (such as Subbasin Review and EAWS), watershed or landscape level restoration objectives are more likely to be achieved for some restoration activities (for example, prescribed fire, road obliteration, thinning, integrated weed management). Example reasons why restoration treatments may fail to meet the intended objective include:

- ♦ Planning may not recognize an important interaction that ultimately negates the objective (for example, a seeding was not expected to attract large numbers of ungulates to the area, yet off-site conditions result in a large increase in ungulate use and the seeding fails; a road removal project was designed to reduce adverse effects caused by sediment delivery but context was not fully considered and upland conditions caused sediment to increase for the watershed rather than decrease after the road obliteration; an integrated weed management restoration project was planned to reduce the spread of weeds into an area following thinning but the weed management efforts failed to consider context and weed seed from up-slope areas spread rapidly to the treated area negating the weed management efforts).
- ♦ Funding for subsequent maintenance may not be forthcoming (for example, culverts are installed that require periodic cleaning of woody debris, yet funding was not forthcoming to allow the cleaning to occur and the result may be to wash some culverts away).
- ♦ Climatic conditions such as several years of above or below normal rainfall or warmer temperatures may affect the project in unplanned ways (for example, a prescribed burn is conducted with a seeding to follow, yet drought is experienced the following two growing seasons and the seeding fails).
- ♦ Unanticipated rain storm, flood, ice flow, snow storm, or other event may negate the positive aspects of the project (for example, a riparian rehabilitation project is undertaken that includes planting willow species near the stream, yet an unusual winter rain-on-snow event results in an ice flow that scours the area of the planting).



- ♦ Vegetation treatment may fail to meet the planned objective (for example, thinning from below to encourage large older trees and reduce potential fire that fails to consider context within the landscape or watershed may not be effective in the face of a conflagration type fire; a prescribed fire was planned to reduce fuel loading and risk of uncharacteristic fire effects but the prescribed fire planning failed to consider context within the watershed and fuel connectivity within the watershed caused severe fire effects across a large portion of the watershed following wildfire).
- ♦ Removal of livestock as a restoration treatment may have unintended outcomes (for example, the build-up of herbaceous vegetation following livestock removal may result in a ridge top fire spreading to the riparian area where undergrowth and ladder fuels are substantial and the entire riparian area burns with an uncharacteristic fire).
- ♦ Leaving an unroaded area with no fuels treatments may result in unplanned outcomes to old-growth habitats (for example, patches of old growth interspersed within a forested unroaded area may be affected by bark beetle outbreaks initiated in dense multi-story stressed forests within the unroaded area).
- ♦ Road obliteration to reduce road densities may result in unplanned outcomes (for example, removing roads without reducing fire risk may make suppression activities ineffective, resulting in fires that kill the structural habitat components of the species the treatment was intended to benefit).

## Additional Assumptions Used in the SAG Analysis

The following assumptions were necessary for the analysis process and were developed by the SAG after the previously mentioned assumptions that were coordinated with the EIS Team.

## Landscape Assumptions

### *Uncharacteristic Soil Disturbance*

The landscape restoration and maintenance management landscape modeling prescriptions (N1, N4, A1, A2, A3) are assumed to produce 20 to 80 percent less uncharacteristic soil disturbance than their comparable traditional management modeling prescriptions (C1/N6/P1 for N1/A1, N2/N7/N5/P2 for N4, N3/N8/C2/C3/P3 for A2/A3). This assumption is important for estimating effects of the Supplemental Draft EIS alternatives on aquatic and terrestrial habitats and populations. Disturbance of the soil surface – particularly exposure of bare soil, displacement, churning, and compaction – can result in increased erosion, loss of soil productivity, and increased sediment production. Roads, skid trails or access trails along drainages or down slopes can become conduits for sediment delivery to streams and can decrease soil productivity through erosion and compaction. Excessively hot prescribed fires that burn in accumulated ground fuels during dry soil surface conditions can reduce soil surface cover, burn out large wood and roots, and cause hydrophobic soil surface conditions. “Wildland fire use for resource benefit” may cause similar effects in wilderness and roadless areas, although the risk is less since fuel loads are less likely to exceed historical ranges. Any of the modeled prescriptions could cause uncharacteristic soil disturbance if they are not consistent with natural disturbance regimes and biophysical site conditions.

On-the-ground samples of soil disturbance (Hann, Jones, Karl, et al. 1997) indicate that “wildland fire use for resource benefit” in fuel conditions similar to historical patterns exposed only 2 to 5 percent bare soil and consumed 0 to 100 percent of soil litter (mean ranged from 15 to 35 percent). In contrast, tractor or dozer skidding with dozer piling and burning generated 25 to 75 percent bare soil. Activities that used low impacts methods such as forwarders, horse logging, helicopter logging, or complete log lift cable yarding, combined with broadcast prescribed fire, produced soil disturbance levels similar to those considered typical of natural systems.

The amounts of the restoration harvest, thinning, and prescribed fire increase by 2 to 10 times in restoration and maintenance areas of the high restoration priority subbasins. Yet, depending on the area and type of management prescription, soil disturbance is pro-



jected to decrease, stay the same, or increase by only a small amount. This is because the design and implementation of restoration and maintenance treatments are assumed to produce effects that are similar to those occurring in the natural system and mitigate risks generated by past fire exclusion and traditional management activities. It is also assumed that monitoring and adaptive management would result in adjustment of treatments to reduce soil disturbance to levels no higher than those from natural wildfire.

The SAG did not include the substantial influence of hierarchical landscape step-down (that is, Subbasin Review to EAWS to project analysis) in modeling uncharacteristic soil disturbance. The effects of step-down were purposely excluded so that differences in alternative objectives and standards, as well as levels of influence of hierarchical landscape step-down, could be assessed in a separate variable. Uncharacteristic soil disturbance would decline in response to increased amount and quality of step-down, including Subbasin Review, EAWS, and project analysis. Decreased soil disturbance should result from increased step-down analysis because activities would be more integrated and the resulting conditions would better fit local disturbance and biophysical conditions.

Some lands under Forest Service and BLM administration do have high levels of uncharacteristic soil disturbance. Cumulative effects on these areas could be much higher than the average annual values indicate.

## **Terrestrial Vertebrates Assumptions**

Explicit modeling assumptions included the following:

Trends in livestock grazing effects departure and in historical range of variability (HRV) departure variables derived for each 6th-field HUC provide an accurate measure of the direction in trend for riparian vegetation quality in each 6th-field HUC, as long as large collections of 6th-field HUCs are evaluated (such as across a RAC/PAC or basin). Riparian vegetation quality is defined as the degree to which historical composition and structure of native trees, shrubs, grasses, and forbs are present in the riparian area at a specified time point. Magnitude of the trends in livestock effects departure and HRV departure for each 6th-field HUC, however, will not accurately measure magnitude of effect of the trend on riparian vegetation quality, since negative effects will typically be stronger in the riparian areas than in the

uplands. Livestock effects departure may also index the direct effects of trampling on vegetation and nesting structures. Thus, 6th-field HUC estimates of livestock grazing effects and HRV departure that have negative trends will typically underestimate the magnitude of this negative trend in riparian areas.

Trends in snag density and log density estimated for each 6th-field HUC follow the same logic in terms of how such trends index snag and log density trends in riparian areas as stated above under assumption number 1. That is, snag and log density trends for a 6th-field HUC will accurately measure the direction in trend but not the magnitude of trend for the riparian areas in each 6th-field HUC, and direction in trend will be accurate only when assessed across a large set of 6th-field HUCs.

A large number of the terrestrial vertebrates that depend on riparian habitats also are negatively affected by a variety of road-associated factors. Trends in these factors can be indexed by trends in road density class for each 6th-field HUC under the assumption that 6th-field HUC road density trends index a similar direction in trend for roads within riparian areas. This assumption is logical because most larger riparian areas (such as third order and larger stream systems) contain roads, and road density is typically higher in these larger riparian areas compared with upland environments.

## **Plants Assumptions**

Key ecological and implementation assumptions include:

The most favorable current state for a taxon would be to have its current distribution meet or exceed the taxon's historical range and be of sufficient quality to support the type and degree of within-population and metapopulation interactions that the taxon would characteristically engage in if it were not habitat-limited. When conditions are below this state, taxa are at some risk, varying from a low degree of risk to a high degree of risk for taxa that are very rare and isolated. Because SAG does not have current information on the distribution of each taxon, they were not able to estimate the current state.

It is assumed that existing conservation strategies and agreements that have been adopted will continue to be implemented under all alternatives.

It is assumed that existing agency policies, laws and regulations, and Forest and Resource Management Plans will be adequate for managing taxa that have a



local or fine-scale distribution, exist on only one administrative unit, and are designated as agency sensitive or have special status.

Projections of persistence trend are based on the direction in the Supplemental Draft EIS and the known effectiveness of implementation of conservation strategies. The lack of details regarding step-down processes and implementation procedures leaves some risk to taxa even though they may be rated as stable into the future.

Existing policies and regulations under the National Forest Management Act (NFMA) and the Federal Lands Policy and Management Act (FLPMA) or in land use plans provide sufficient direction for the conservation and protection of taxa that occur on only one administrative unit.

Information on the distribution and status of rare plants within the ICBEMP is dynamic. At the completion of each field season, it is assumed that this new information is incorporated and considered in new decisions. Following this process will help to minimize the risks to rare plants. Given the nature of the data, a list of species of concern can be a moving target, quickly outdated and in need of revision. The conservation of rare plants is better addressed through processes and criteria rather than through species-specific direction. Objectives, standards, and guidelines, in combination with appropriate step-down processes, can be used to ensure long-term viability of plants of conservation concern.

Conservation strategies are the most efficient method of long-term conservation and management for rare plants, since they meet the NFMA and Endangered Species Act (ESA) requirements for managing across the range of a species. Those taxa occurring in several administrative units are at the greatest risk of extirpation if not managed consistently range-wide through the development of conservation strategies. Providing direction to develop them is a positive step forward. Ensuring viability will depend on implementation and monitoring strategies as well as a step-down process that addresses risks to these species. The long-term viability of these taxa will depend on the completeness of this forthcoming direction. It is assumed that existing conservation strategies and agreements that have been adopted will continue to be implemented under all alternatives.

## Aquatics Assumptions

In the A1/A2 subwatershed network, SAG assumed that migrant survival will strongly influence the

future status of anadromous salmonids. They also assumed that migrant survival is strongly dependent on the number of mainstem dams in the migratory corridor. Because status is so strongly linked to the corridor, it is possible that the effects of dams may mask the potential benefits associated with the conservation and restoration efforts in each alternative. To consider that possibility, SAG analyzed an additional scenario with the networks where it was assumed the influence of several dams was removed from the Snake River. In essence all subwatersheds that were associated with low migrant survival (more than five dams) in the original analysis were considered to have moderate migrant survival (three to five dams) in this scenario. All other inputs for the model remained the same for each alternative.

Assumptions about the influence of dams on the status of anadromous salmonids did not influence the interpretation of the trends among alternatives.

The SAG definition of aquatic habitat capacity implies that a range in habitat conditions is likely at any point in time and recognizes that these conditions will vary through time in response to natural disturbance and vegetation succession. It is not assumed that optimum conditions always will exist in the absence of human activity. However, SAG did assume that a subwatershed in which sediment input, riparian habitat, and hydrologic regime have not been substantially altered by human activity will be more likely to contain aquatic habitat conditions that are closer to optimum for indigenous salmonid species than in a subwatershed where one or more of these components have been considerably altered by human activity.

Even though the states in the belief networks are couched in probabilities, SAG did not assume that they are accurate estimates of true probabilities or “risks.” Rather, they represent the strength of SAG’s belief in the status or trends for particular elements of the system.

Where SAG parameterized portions of the networks using experts, it is assumed that the inconsistencies among experts represent uncertainty in outcomes resulting from inherent variability in the system and uncertainty in our understanding of nature. Differences or confusion in the interpretation of or the definition of states of nature reflect the limitations of our understanding.

It is known that the predicted results of management activities and alternatives at 10 years and at 100 years will influence the system into the future. For the sake of the evaluation, however, the SAG assumed that the biological response is only to the conditions at the



point of evaluation (that is, 0, 10, 100 years). For conceptual purposes, the SAG selected 50 years from the point of evaluation as a reference for estimates of the conditional probabilities in fish status. This is equivalent to a traditional population viability analysis that provides a probability of persistence to some point in the future but assumes static conditions in the environment throughout that period.

Where a subwatershed is a composite of a high order main stem reach and low order tributaries (order > 0) rather than a true watershed (order = 0), it is assumed that habitat conditions for fish in the subwatershed being evaluated are best represented by the mean of conditions in all contributing subwatersheds up to a threshold order. The SAG assumed that where subwatersheds are of an order higher than 20 for chinook and steelhead, 10 for redband and Yellowstone cutthroat, and 5 for westslope cutthroat and bull trout, then all spawning and rearing are associated primarily with the tributary streams and not the main stem part of the stream network. Thus, for subwatersheds that are higher order than this threshold, the analysis does not include the contributing subwatersheds.

The SAG assumed that effects of federal land management activities on salmonid fishes will be most influential and measurable in spawning and rearing habitats.

It is assumed that the status and trends of salmonids and their habitats are the most representative indicators of the responses in aquatic ecosystems related to federal land management.

It is assumed that the effects of climate change do not vary among the alternatives. Climate change may play a role in status or trends of fishes or habitats, but it is not incorporated in the model.

SAG assumed that factors influencing the condition of habitats for fishes that are not contained in the A1/A2 subwatershed network used for the evaluation simply add to the uncertainty about the likely future status.

Activity levels other than grazing are assumed not likely to strongly influence riparian condition. In other words, future riparian condition is viewed as the result of current condition, grazing levels, and riparian management direction that may influence grazing or other activity within the buffer but not the magnitude of that other activity. This may result in a more pessimistic assessment of the condition of riparian areas where riparian management direction is weaker but little activity is expected; however, the SAG assumed that is a minor error.

For subwatersheds with multiple ownership or management direction, it is assumed that the net effect of the mix of prescriptions across the different management areas will simply be the average of the probabilities for the various areas weighted by their aerial extent. This will increase the uncertainty of the effects, which the SAG thinks is appropriate in this case because they do not know the spatial pattern of the management areas or their existing cumulative disturbance effects.

It is assumed that the uncertainty associated with each estimate of subjective probability in the cpts is trivial compared to the overall uncertainty in the model; hence, each of these probabilities is treated as a point estimate. Furthermore, the SAG did not assign an equivalent sample size (ess; in Netica terminology) to each of the subjective probability estimates, so the SAG assumed that all experts contributing to a given cpt had the same level of relevant knowledge.

Current data on "known" distribution and status of salmonids are assumed to be a reasonable representation of the true distribution for purposes of the analysis. It is known that the distributions can be updated with new information or reinterpretation from biologists across the region. The SAG did not use recent updates for Region 1 or 4 because similar updates were not available for the entire basin.

Explicit standards based on ecological performance measures are assumed to provide greater certainty that direction will be understood and implemented consistently. Performance measures include quantifiable biological or physical processes or capacities related to riparian composition and structure or water quality, for example. If the overall goal is to maintain or restore natural ecosystem processes, then some performance measures are needed that can be used to indicate if the current trend is moving in the desired direction (Sedell et al. 1997). Outcome-based direction provides greater flexibility to tailor management to the situation and potentially greater ownership of the means to achieve objectives, but it requires increased oversight and monitoring to ensure compliance and consistency. The SAG assumed specific, explicit standards would be more readily understood initially and, therefore, initial compliance would be higher and ecological objectives achieved more rapidly.

Adverse effects of activities in wilderness areas on aquatic habitats are primarily limited to recreation, fire management, and light livestock grazing in some areas. The SAG assumed effects of fire and grazing management would be captured in the landscape



variables used to model the fire/flood and grazing effects on habitat condition.

Probabilities of habitat maintenance/restoration were lower for A1 subwatersheds than for wilderness areas because of higher levels of ongoing activities and uncertainties concerning how those areas were initially identified and subsequently adjusted. Designation of A1/A2 subwatersheds under Alternative S3 is subject to an arbitrary acreage limitation. If the acreage of subwatersheds that meet the criteria for A1/A2 designation exceeds the limitation, no direction is provided in the Supplemental Draft EIS for selecting those included in the network. The SAG assumed that subwatersheds managed as A1/A2 would be accurately assigned and meet the criteria as described.

Subbasin Review and EAWS would be necessary to effectively manage and integrate a strategic approach to sustaining or restoring the complex resource, landscape, and socio-economic conditions within a subbasin. The SAG considered that the information developed through Subbasin Review and EAWS provides the strategic focus and transparent logic from which multiple projects would be coordinated.

## Socio-economic Assumptions

Critics contend that economies are dynamic and that interactions at regional, national, and international scales may overwhelm or offset any impact of Forest Service and BLM decisions. Because of these concerns, the SAG was more concerned about the impact of Forest Service and BLM decisions on the ability of an economy to adapt to change.

Recreation jobs are assumed to remain constant for each of the alternatives. The SAG made this assumption because the various projections of the distribution of Recreation Opportunity Spectrum (ROS) acres remains the same in all alternatives (other than for a small shift in Alternative S1). Crone and Haynes (in press) discuss the development of the revised estimates of recreation jobs based on revisions in the recreation response coefficients, or number of jobs per visit, for each of 12 recreation activities.

Direct lumber and wood products jobs were calculated using the same approach that was used in FEMAT (1993): by multiplying the estimates of timber harvest by the number of jobs (7.75) per million board feet. The SAG assumed no offsetting increases in harvests from non-federal lands. Initial estimates of the average annual timber harvest summed to RAC/PACs was projected for the first and tenth decades using the CRBSUM model calibrated to current harvest levels.

As in FEMAT, the SAG assumed no job changes for the pulp and paper industry (Standard Industry Code [SIC] 26) because this sector would not be directly affected by changes in timber volumes harvested from Forest Service- and BLM-administered lands. This is not to suggest that there will not be impacts on the pulp and paper industry, only to suggest that the industry will respond to supply-induced changes in ways different from the solid wood products sector.

The number of forestry workers (SIC 08) required for the pre-commercial thinning and fuel management assumed in the CRBSUM runs was estimated using one job per 500 acres treated. Range restoration jobs were also calculated based on one job per \$43,125 of expenditures.

The assessments of socio-economic resiliency assume that the counties and BEA areas within the basin will continue (in the next decade) to experience the economic and demographic patterns of the recent past. The future, however, may hold surprises that will result in different outcomes than assumed here. It is known, for example, that the basin has experienced periods of both in-migration and out-migration. (In the 1980s, for example, the basin experienced net out-migration as the United States underwent periods of severe recession, structural changes in the economy that diminished the role of resource-based [including agriculture] sectors, and booms in other economic sectors and regions.) Despite these risks, history has shown that humans are highly adaptive creatures in the basin's ecosystems; the SAG assumed that faced with risks, people will continue to adapt and demand ecosystem goods and services from Forest Service and BLM-administered lands in the basin.



Table 1. Management Prescriptions to Simulate the Supplemental Draft EIS Alternatives

Rx	Description of Management Prescription Sets (Rx) for Modeling the SDEIS Alternatives.
HI	Prescription set to model 100-year and 400-year simulations of HRV.
Ecological Restoration Prescriptions	
A1	Prescription set with moderate levels of ecological restoration. Generally designed for areas that have moderate to high departure from HRV, in roadless or conservation areas.
A2	Prescription set with moderate levels of ecological restoration. Generally designed for areas that have moderate departure from HRV, in areas with road access.
A3	Prescription set with moderate levels of ecological restoration. Generally designed for areas that have high departure from HRV, in areas with road access.
N1	Prescription set with low levels of ecological restoration. Generally designed for maintenance of areas that have low departure from HRV.
N4	Prescription set with low levels of ecological restoration typically for use in visually sensitive areas or where the objective has mixed traditional and ecological restoration objectives. Generally designed for areas that have low departure from HRV.
Traditional Reserve Management Prescriptions (wilderness and semi-primitive roadless areas)	
C1	Prescription set for traditional wilderness, park, and semi-primitive area management with minimal ecological mitigation.
N6	Prescription set for traditional wilderness and semi-primitive area management with minimal ecological mitigation.
P1	Prescription set for traditional reserve management with low probability of successful wildfire suppression.
Traditional Commodity Management Prescriptions	
C2	Prescription set for traditional commodity and resource value production at high levels with some ecological mitigation.
C3	Prescription set for traditional commodity and resource value production at high levels with no ecological mitigation.
N3	Prescription set for traditional commodity and resource value production at moderate levels and some ecological mitigation with higher livestock grazing than N8, and low probability of successful wildfire suppression.
N5	Prescription set for moderate level traditional commodity and resource value production with low emphasis on exotic weed control on rangeland.
N8	Prescription set for traditional commodity and resource value production at moderate levels and some ecological mitigation.
P3	Prescription set for traditional commodity and resource value production at very high levels with no ecological mitigation.
Traditional Management in Visually or Environmentally Sensitive Areas Prescriptions	
N2	Prescription set for moderate level traditional commodity and resource value production in visually sensitive areas with somewhat higher livestock grazing than N7 and minimal ecological mitigation.
N7	Prescription set for moderate level traditional commodity and resource value production in visually sensitive areas with minimal ecological mitigation.
P2	Prescription set for minimal levels of management in visually sensitive areas with no ecological mitigation and low probability of successful wildfire suppression.

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# Appendix 17a

## Definitions for Old Forest

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## Introduction

In October, 1989, the Chief of the Forest Service directed all Regional Foresters to develop ecologically based old-growth. (The terms "old growth" and "old forest" are used synonymously in the Interior Columbia Basin Ecosystem Management Project Environmental Impact Statement. Project personnel have favored use of "old forest" as more evocative of the ecosystem being discussed.) Definitions for the major forest cover types as defined in *Forest Cover Types of the United States and Canada*, Society of American Foresters, F.H. Eyre, Editor, 1980. The definitions were to be based upon the generic direction described in the following sections.

## Purpose and Scope

The following describes the ecologically important structural features of old-growth ecosystems. Measurable criteria for these attributes will be established in more specific definitions for forest types, habitat types, plant associations, or groupings of them. The intent of the generic definition is to guide design of specific definitions.

## Definition

Old-growth forests are ecosystems distinguished by old trees and related structural attributes. Old growth encompasses the later stages of stand development that typically differ from earlier stages in a variety of characteristics which may include tree size, accumulations of large dead woody material, number of canopy layers, species composition, and ecosystem function.

## Description

The age at which old growth develops and the specific structural attributes that characterize old growth will vary widely according to forest type, climate, site conditions, and disturbance regime. For example, old growth in fire-dependent forest types may not differ from younger forests in the number of canopy layers or accumulation of down woody material. However, old growth is typically distinguished from younger growth by several of the following attributes:

1. Large trees for species and site.
2. Wide variation in tree sizes and spacing.
3. Accumulations of large-size dead standing and fallen trees that are high relative to earlier stages.
4. Decadence in the form of broken or deformed tops or bole and root decay.
5. Multiple canopy layers.
6. Canopy gaps and understory patchiness.

Compositionally, old growth encompasses both older forests dominated by shade-intolerant species, which are fire-dependent, and forests in near climax stages dominated by shade tolerant species. Rates of change in composition and structure are slow, relative to younger forests. Different stages or classes of old growth will be recognizable in many forest types.

Sporadic, low to moderate severity disturbances are an integral part of the internal dynamics of many old-growth ecosystems. Canopy openings resulting from the death of overstory trees often give rise to patches of small trees, shrubs, and herbs in the understory.

Old growth is not necessarily "virgin" or "primeval." Old growth could develop following human disturbances.

The structure and function of an old-growth ecosystem will be influenced by its stand size and landscape position and context.

The measurable criteria mentioned above, under *Purpose and Scope*, have been established in more specific definitions by each of the three Forest Service Regions (Northern, Intermountain, and Pacific Northwest) that manage National Forest System lands within the Interior Columbia Basin Ecosystem Management Project (ICBEMP) project area. These three sets of criteria for old-growth ecosystems will be used as guidance by Forest Service and Bureau of Land Management personnel at the Forest, District, and Field Office level during implementation of the management direction of the ICBEMP. For example, the direction for terrestrial source habitat restoration calls for increase in geographic extent and connectivity of various cover types and structural stages, including single-story and multi-story old forest. The three Regional sets of criteria will help field personnel identify old forest cover type.

These three documents have not been included in this appendix in their entirety because of their length. (They total over 300 pages.) If the reader wants to examine them, they will be made available for review if you call the respective Forest Service Regional Offices or the ICBEMP office, 304 N. 8th Street, Room 250, Boise, ID 83702, telephone (208) 334-1770.

## References

Old-Growth Forest Types of the Northern Region, USDA Forest Service, Missoula Montana, April, 1992

Characteristics of Old-Growth Forests in the Intermountain Region, USDA Forest Service, Ogden, Utah, April, 1993.

Region 6, Interim Old Growth Definition, USDA Forest Service, Portland Oregon, June, 1993.



What follows is an example from the Intermountain Region's publication, to show the kind of information in the specific definitions. This sample discusses the Society of American Foresters (SAF) cover type *Interior Ponderosa Pine*, including a table that summarizes old-growth characteristics for ponderosa pine forests of central Idaho.

## Example Old-Growth Characteristics

Species: *Pinus ponderosa* variety *ponderosa* Pacific ponderosa pine - North Plateau Race

### Description

The SAF defined interior ponderosa pine cover type encompasses a very large area of the western United States. In the Intermountain Region it occupies two distinct ecosystem situations. Pacific ponderosa pine, a broadly distributed species, has a distinct north plateau race. That race occurs east of the Cascade Mountains throughout Oregon, Washington, and into Idaho and Montana, and is the sole race discussed in this section.

This cover type has been dramatically altered by human activity. Exclusion of fire and intensive livestock grazing activities have altered stand composition. Often seral ponderosa pine stands are being replaced by associated species, such as Douglas-fir, grand fir, and occasionally lodgepole pine. In all cases, regeneration is much more abundant and has created a layered stand structure largely uncommon in presettlement conditions. Current descriptions of old-growth could be greatly contrived by man's somewhat sporadic actions. Susceptibility to catastrophic events such as fire and pathogens is dramatically changing. The capability to maintain current characteristics of developed old-growth stand attributes is not fully known or understood. However, ponderosa pine, which is a long-lived species may be slowly lost as a major cover type through successional advances, control of fire, and other human-controlled, ecosystem-altering practices.

### Area of Application

In the Intermountain Region this Interior ponderosa pine north plateau race cover type occurs only on the Boise, Payette, Sawtooth, and Salmon National Forests. Within the interior ponderosa pine cover type in southwest Idaho, there are also two distinct categories of situations for old-growth ecosystem definitions:

1. Interior ponderosa pine cover type where ponderosa pine is the climax species; climax sites,
2. Interior ponderosa pine cover type where ponderosa pine is the dominant seral species; seral sites.

### Description of Attributes for Interior Ponderosa Pine (See Table 1)

#### Live Trees

Live trees on seral sites: When a combination of 10 or more trees per acre in the overtopping canopy with a minimum diameter breast height (DBH) of 24 inches or more at an age of 200 years or older are found, old-growth characteristics are evident. These seral sites are generally the moister sites occurring on Douglas-fir and grand fir habitat type series.

Live trees on climax sites: The only difference on a climax site is that at least five trees or more per acre are present. These sites are usually on areas that do not support dense canopies of trees.

Note that in all cases the minimums are not absolute values so minor variations are acceptable.

The old-growth nature of these stands results in a variety of tree ages and sizes. Consequently, there should be at least two recognizable size classes that differ by at least 6 inches in diameter. The size difference should also create at least two layers in the tree canopy on the seral sites. The smaller diameter tree occurs within the same canopy layer on climax sites and has only one canopy layer.

#### Dead trees

Snags will normally be found on the climax sites, but may be clumpy and infrequent. Over large areas up to one snag per acre with a 20-inch DBH or larger, and length of at least 20 feet (average) should exist for seral sites. Insects, root and stem pathogens, and fire are the principal agents causing the development of snags in this cover type.

Climax sites generally have low or infrequent amounts of down woody material. On large area seral sites, one piece, 16 linear feet in length, at least 12 inches diameter at the small end (average) on a per acre basis should exist. This attribute is a function of site productivity, age, and the degree of decadence in the stand. Materials of smaller diameters do not normally persist long enough to be included in the old-growth conditions.

Table 1. Standard Summary of Old-Growth Characteristics

Live Trees						Dead Trees			
Main Canopy			Tree Diameter	Variation in Decadence	Tree Canopy Layers	Tree Standing	Down		
DBH	TPA	Age	6" Classes	TPA-DBH	Number	DBH/Ht "/feet	Trees/acre	Diameter	Pieces/ac min length
Seral Sites 24	≥10	200	≥2	N/A	2	20/20	≥1	12	0-16
Climax Sites 24	≥5	200	≥2	N/A	1	N/A	Infrequent	N/A	Infrequent

Abbreviations used in this table:

TPA = Trees per Acre  
DBH = Diameter at Breast Height  
Ht = Height

Vegetative Series: Douglas-fir, grand fir  
SAF Cover Type: Interior ponderosa pine  
Applicable Area: Boise, Payette, Salmon, and Sawtooth NF





# Appendix 17b

## Regional Definitions for Old Forest

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### Summary

Appendix 17b contains the three old-growth (old forest) definitions developed by the Forest Service in the project area. This appendix includes old forest definitions for: (1) Washington and Oregon (Forest Service Pacific Northwest Region), (2) Montana and Idaho north of the Salmon River (Forest Service Northern Region), and (3) Idaho south of the Salmon River (Forest Service Intermountain Region). These definitions are intended for use by BLM and Forest Service managers in identifying old forests within the project area.

Appendix 17b (approximately 260 pages) can be viewed on or downloaded from the ICBEMP website ([www.icbemp.gov](http://www.icbemp.gov)) or obtained by contacting the ICBEMP office, 304 North 8th Street, Boise, ID 83702; telephone (208) 334-1770, fax (208) 334-1769.

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# Key Acronyms

<b>A1</b>	Aquatic A1 Subwatershed (6th-field HUC)	<b>IWM</b>	Integrated Weed Management
<b>A2</b>	Aquatic A2 Subwatershed (6th-field HUC)	<b>MMBF</b>	Million Board Feet
<b>AIRFA</b>	American Indian Religious Freedom Act	<b>MOU</b>	Memorandum of Understanding
<b>ARPA</b>	Archaeological Resources Protection Act	<b>NAAQS</b>	National Ambient Air Quality Standards
<b>ASQ</b>	Allowable Sale Quantity	<b>NAGPRA</b>	Native American Graves Protection and Repatriation Act
<b>AUM</b>	Animal Unit Month	<b>NEPA</b>	National Environmental Policy Act
<b>BEA</b>	Bureau of Economic Analysis	<b>NFMA</b>	National Forest Management Act
<b>BIA</b>	Bureau of Indian Affairs	<b>NMFS</b>	National Marine Fisheries Service
<b>BLM</b>	Bureau of Land Management	<b>NOI</b>	Notice of Intent
<b>BMP</b>	Best Management Practice	<b>NWFP</b>	Northwest Forest Plan
<b>BO</b>	Biological Opinion	<b>PAC</b>	Provincial Advisory Committee
<b>CDP</b>	Census-designated Place	<b>PFC</b>	Proper Functioning Condition
<b>CEQ</b>	Council on Environmental Quality	<b>PILT</b>	Payment in Lieu of Taxes
<b>CFR</b>	Code of Federal Regulations	<b>PVG</b>	Potential Vegetation Group
<b>CRBSUM</b>	Columbia River Basin Successional Model	<b>PVT</b>	Potential Vegetation Type
<b>CWAP</b>	Clean Water Act Protocol	<b>RAC</b>	Resource Advisory Council
<b>CWD</b>	Coarse Woody Debris	<b>RCA</b>	Riparian Conservation Area
<b>DBH</b>	Diameter at Breast Height	<b>RIST</b>	Regional Implementation Support Team
<b>DEIS</b>	Draft Environmental Impact Statement	<b>RMO</b>	Riparian Management Objective
<b>EAWS</b>	Ecosystem Analysis at the Watershed Scale	<b>ROD</b>	Record of Decision
<b>EIS</b>	Environmental Impact Statement	<b>ROS</b>	Recreation Opportunity Spectrum
<b>EPA</b>	Environmental Protection Agency	<b>RHCA</b>	Riparian Habitat Conservation Area
<b>ERU</b>	Ecological Reporting Unit	<b>SAG</b>	Science Advisory Group (ICBEMP)
<b>ESA</b>	Endangered Species Act	<b>SIT</b>	Science Integration Team (ICBEMP)
<b>ESC</b>	Executive Steering Committee (ICBEMP)	<b>SDEIS</b>	Supplemental Draft Environmental Impact Statement
<b>FACA</b>	Federal Advisory Committee Act	<b>T</b>	Terrestrial T Watershed (5th-field HUC)
<b>FEIS</b>	Final Environmental Impact Statement	<b>TEP</b>	Threatened, Endangered, or Proposed Species
<b>FEMAT</b>	Forest Ecosystem Management Assessment Team	<b>TERO</b>	Tribal Employment Rights Office
<b>FERC</b>	Federal Energy Regulatory Commission	<b>TMDL</b>	Total Maximum Daily Load
<b>FLPMA</b>	Federal Lands Policy and Management Act	<b>UCRB</b>	Upper Columbia River Basin
<b>FOIA</b>	Freedom of Information Act	<b>USDA</b>	U.S. Department of Agriculture
<b>FSEEE</b>	Forest Service Employees for Environmental Ethics	<b>USDI</b>	U.S. Department of the Interior
<b>GIS</b>	Geographic Information System	<b>USFWS</b>	U.S. Fish and Wildlife Service
<b>HRV</b>	Historical Range of Variability	<b>USGS</b>	U.S. Geological Survey
<b>HUC</b>	Hydrologic Unit Code	<b>WCI</b>	Watershed Condition Indicator
<b>ICBEMP</b>	Interior Columbia Basin Ecosystem Management Project		



